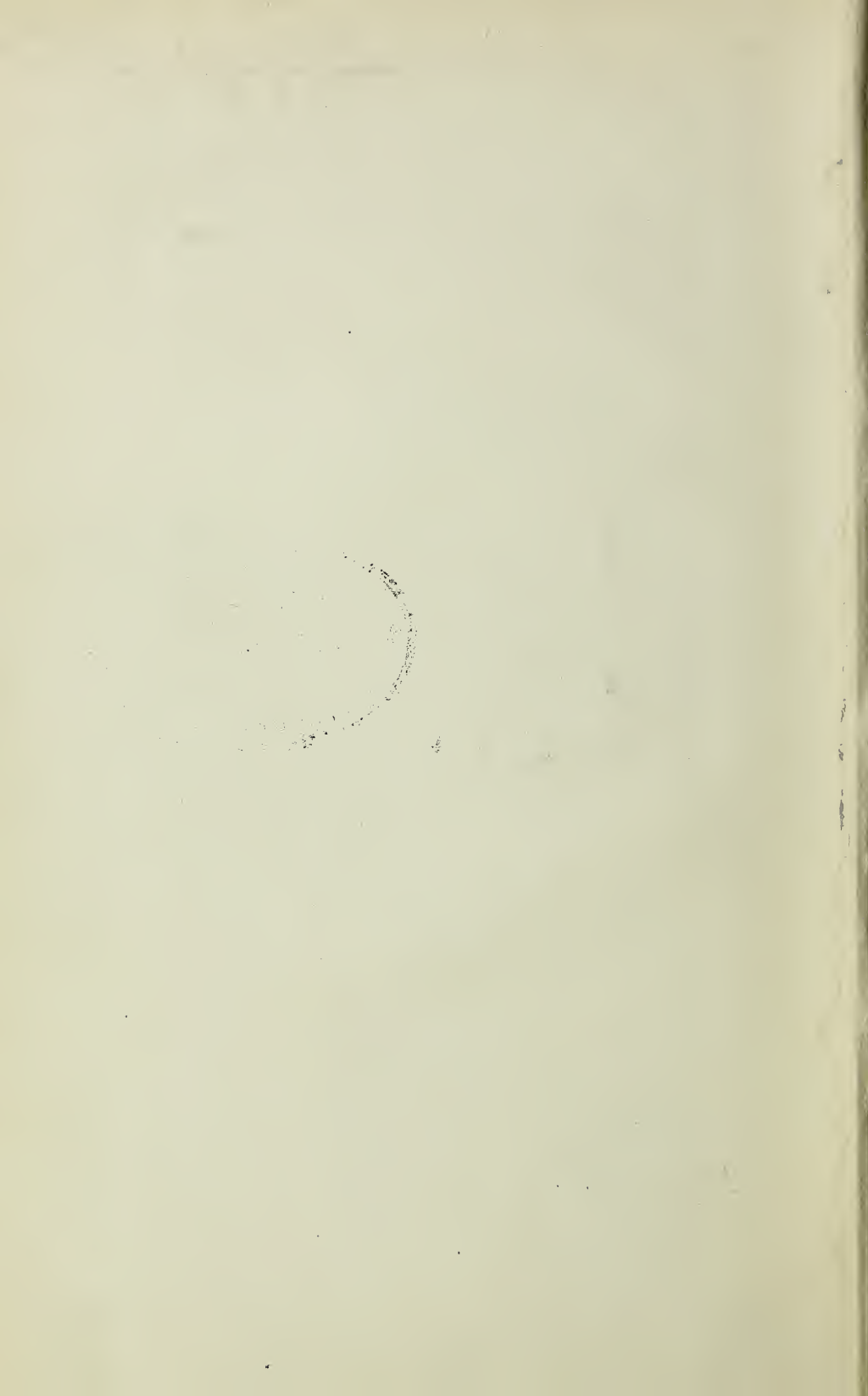


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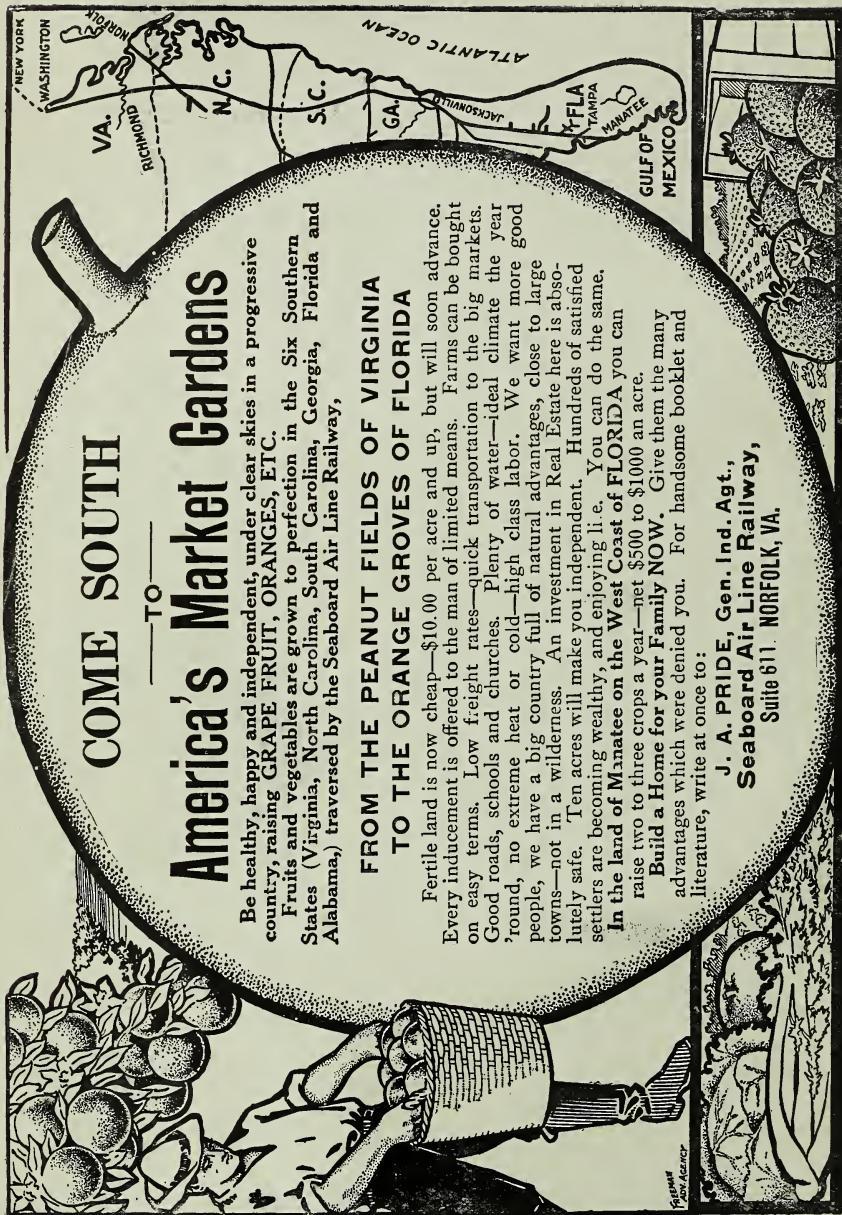
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1912
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Gleanings in Bee Culture





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NO. 1

Editorial

THE DEATH OF JAMES HEDDON.

WE have just received notice that James Heddon, one of the best-known bee-keepers of 20 years ago, died at his home in Dowagiac, Mich., on Dec. 7 last. A biographical sketch will appear in our next issue.

GLEANINGS BEGINNING ON ITS 40TH YEAR.

A GLANCE at the bottom of the first cover page of this issue will show that GLEANINGS is now entering on its 40th year. The editor is also reminded that he is now entering on his 27th year at the editorial helm of this journal. Our managing editor, Mr. H. H. Root, has for 9 years selected most of the copy from our correspondents in the field.

SPECIAL ISSUES FOR 1912.

WE call the attention of our readers to the fact that this issue, our "Beginners' Number," is the first one of a series of six special numbers. We are endeavoring to collect articles written by specialists that will furnish exceptionally valuable reading along the lines suggested. With this in view we are soliciting these articles from well-known authorities; for, although we have on hand more material than we can use for some time to come, it is always our aim to place before our readers the best that can be obtained.

The rest of the special numbers will occur as follows: February 15, "The Bee-keeper and the Poultry-man;" March 15, "Bee Culture and Horticulture;" May 1, "Preparing Colonies for the Harvest;" July 1, "Honey Harvesting and Marketing;" September 1, "Wintering."

In addition to these special numbers we are glad to announce a series of articles from no less an authority than J. E. Crane, of Middlebury, Vt., entitled "The Experiences of a Foul-brood Inspector." This series is illustrated, and we are sure it will prove valuable, not only to the foul-brood inspectors over the country but to all bee-keepers as well. Mr. Crane has had a long experience, and his position as an extensive producer of honey enables him to sift the wheat from the chaff as capably in these articles as he does in his regular department. There are eight articles in all, the first of which will probably appear in the February 1st

issue, the rest following in continuous order, with the exception, possibly, of the special numbers.

OUR COVER PICTURE.

THE picture on the cover of this number is suggestive of a beginner making his first start with bees. Notice the box containing the three-frame nucleus that he has just bought. One of the frames he has already transferred to the hive in readiness; the second one is just being lowered into position, while the third is still in the shipping-box. Those of our readers who made their start from a nucleus (and, in fact, those who started with a full colony) can remember the eagerness with which they watched for the arrival of those first bees, and the thrill they had in seeing them begin at once to fly in and out of the new hive. Of all the different lines of outdoor work taken up by suburbanites, or even residents of cities, we believe there is none more entrancing than that of caring for a few colonies of bees.

The extensive producers who may be styled professional bee-keepers, and who number their colonies by the thousands, can not afford to overlook the efforts of the amateur; for more than once such amateur, owing to his boundless enthusiasm and love of the revelation of nature which bee-keeping affords, has stumbled on to some new principle. Without beginners there can never be experts, for no man has yet been born with an inherited knowledge of bees and bee-keeping.

COMMON MISTAKES BEGINNERS ARE APT TO MAKE THE FIRST YEAR.

IN any line of business there are some things that must be learned by experience; but in bee-keeping especially there are some difficulties that a beginner encounters that do not form much of an obstacle to one who has kept bees for a few years. While it is impossible to make a list of *all* the troubles that perplex beginners, and while explanations regarding them do not always take the place of the knowledge gained by real work in the yard, it is, nevertheless, profitable now and then to consider some of the mistakes that are most commonly made.

We will first take up the list of those that

are encountered at this time of the year.

First, a beginner, as he goes out among his outdoor-wintered colonies after the first warm fly day, on seeing the number of dead bees in front of the entrances naturally concludes that he is going to lose all his bees before spring. As a matter of fact, there is sure to be *some* mortality; and the stronger the colony the greater the number of dead bees that will be found.

Or we will suppose that Mr. Beginner has his hives in the cellar. Even when conditions are ideal, and he has complied with all the rules for safe wintering, he will find what appears to be an abnormally large number of dead bees on the cellar bottom; and again he is sure he is going to lose all of his bees. The fact is, there is bound to be a good many even when conditions are normal—especially toward spring. If he begins to tinker with his bees to see what is the matter, he will make matters ten times worse than they were.

Some over-enthusiastic novice may be inclined to open up his hives of outdoor bees every now and then to see how they are coming on. If they have been properly fed and properly housed, he will do well to leave them entirely alone.

Perhaps he is afraid they have not enough stores, and then he will try to feed them liquid syrup, which they will not take if the weather is at all cold. If the syrup is left on top of the cluster they will take it down the first warm day, and then they will fly out at the entrances to find more, only to become chilled and die on the ground. Feeding should not be practiced during winter except to give cakes of hard candy, queen-cage candy, or combs of sealed stores.

Sometimes a beginner on a cold day, looks down into his hive and finds a ball of bees only a little larger than his double fist, even in some of the best colonies. "My, oh my!" he concludes, "this will never do;" and so, perhaps, he will attempt to unite. He does not know, perhaps, that the strongest colonies—the very best—that he or any one else may have—can compress themselves into a space almost as small as the double fist providing the weather is very cold.

Many a beginner makes the mistake of placing his hives on an exposed knoll where the cold prevailing winds can strike them. Apiaries should always be protected by being placed in an inclosure formed by a barn, out-buildings, fence, or shrubbery—any thing that will break the force of the wind.

In the spring of the year, one starting in bees reads what is said about spreading brood in order to get more brood. He undertakes to do work of this kind with insufficient knowledge of the requirements. The novice and most experienced bee-keepers should not undertake to disturb the positions of the combs in the early season. As a general thing it will do more harm than good.

Reading that bees should be stimulated in the spring by feeding, some beginners will feed when the weather is too cool or

when honey is coming in from fruit-bloom. No feeding should be practiced at either time.

Many beginners make the mistake, after having read all the bee-books, and keeping bees for a couple of years, of supposing that they "know it all" when they don't. Such people usually wander into the stage of inventing bee-hives or bee-feeders. They should understand that most veterans who know most about the business do not waste any time in trying to improve (?) on the basic principles put forth by father Langstroth. The fact is, nearly all the so-called improvements on the Langstroth frame and hive have been a step backward rather than forward. If our beginner friend clearly understands this, perhaps he will not get it into his head that he is going to revolutionize hives and appliances.

Another trouble with the beginner is that he is apt to be too impatient to get his crop of honey. He reads of some one's great success, or possibly hears his neighbor telling about putting on a super on such and such a day and taking off 32 full sections a little later, and he is perplexed because he can not get the same results. His bees seem to be working so steadily and so industriously that he can not understand why they don't go into the super on business intent; and at the very start he is apt to get discouraged, feeling that all the reading which he did has not prepared him for even this first emergency. He finds that the books recommend the use of "baits" in the supers to get the bees started, and he wonders whether a bait consists of a bunch of flowers, the sweet perfume of which would be attractive, or what. On reading further he finds that "baits" are unfinished sections containing some honey left over from the year before, or, possibly, merely sections with the comb pretty well drawn out. As he has just started, and has nothing left over from the year before, he wonders where he is going to get his bait. Meanwhile, the bees keep on flying merrily, but refuse to notice the tempting white sections above them with their starters of comb foundation.

WHY BEES DO NOT ENTER SUPERS.

As explained in the questions and answers under Heads of Grain in this issue, there are several reasons why bees do not go above for storing honey; and it may be any one of them or a combination of several. In the first place, it must be remembered that the tendency of the bees is to place honey as close as possible to the brood. It is much handier there, and far more convenient for winter. Estimates vary as to the actual amount of honey which bees consume themselves during a year; but assuming that it is 300 lbs., it is plain that the surplus honey—that is, that which is stored in the sections—forms only a relatively small percentage of the honey really brought into the hive. The super, then, is to the bees what the savings bank is to mankind—a storage-house for the surplus wealth accumulated during a period of prosperity. A colony that is not strong

and prosperous, therefore, is not capable of storing any great amount of surplus; and what they do store they prefer to place as near as possible to the brood in combs that the queen does not occupy, owing to the small number of nurse bees in the colony.

A colony with a failing queen rarely does much in the super; for if the queen lays less and less, the bees keep putting more honey in the cells left vacant by the hatching brood, and, finally, the queen has very little room to lay. Bees are creatures of habit; and when once they get started to storing honey in the brood-combs it is more difficult to get them to go to work above.

It is often the fault of the season that bees do not work in the supers; for unless the honey comes in with a rush so that the bees are able to store much more than they can possibly use they can not be induced to go into the sections. A beginner is often deceived in thinking that his bees are working hard, when, in reality, they are working only a little, or perhaps merely playing or loafing. During a good honey-flow, when a colony is working well, the heavily loaded bees have no time for play, and they drop down on to the alighting-board and immediately crawl into the hive in such numbers that it is impossible to count them. At such times the field bees forget every thing except work; and they are so busily engaged that they have no thought, except the one mad desire to bring in more and more. Under these conditions, unless they get sidetracked on to swarming there is generally very little difficulty in getting them into the super provided the brood-combs are pretty well filled with brood, so that there is not much room for the storage of surplus honey there.

THE SWARMING PROBLEM.

Some beginners are perplexed because their bees won't swarm, and others because they swarm too much. It is a question whether the beginner, the first year at least, should attempt any form of artificial increase; for the natural-swarming method is the best for one who lacks experience; and one swarm in a season is all that should be allowed. The books describe fully a number of good plans for preventing after-swarms—that is, all swarms after the first one, which is called the "prime" swarm.

GETTING HONEY AT THE EXPENSE OF COLONY LIFE.

After the honey-flow the most costly mistake that the beginner can make is to leave his colony or colonies, as the case may be, in poor condition for winter. A rather weak colony, composed mainly of worn-out bees, is not likely to live through the winter, no matter how securely the hive is protected, nor how well supplied with stores the combs are. If there is no fall honey-flow, of if the queen does not keep up brood-rearing long enough to insure a good force of young bees to go into winter quarters, some feeding is necessary; and here it is that the beginner often blunders. He is not well enough post-

ed on methods of feeding as given, in the books, and perhaps his first difficulty occurs soon after beginning to feed. He is astonished to find that the bees become very irritable, and commence fighting, apparently, among themselves. The real situation is that the feed, instead of being supplied in the evening, is given in the morning; and during the excitement other bees from some other hive or from some bee-tree in the locality are attracted, and robbing is the result. Wholesale fighting begins, and many bees are killed. At this time they are so cross it is almost impossible to do any thing with them, and even dogs or horses that get in their way are apt to be stung. During a dearth of honey great care is necessary to prevent spilling any syrup or leaving any exposed sweets around to invite robbers.

DO NOT WINTER IN A CLOSED ROOM ABOVE GROUND.

If a colony is wintered in a place where the temperature changes very much, the bees must have an opening to the outside air. In other words, the inside of a barn or granary is not a fit place for a colony of bees in the winter unless the hive is placed close to the outer wall and an opening made for the alighting-board so that the bees may fly when the weather is suitable. In a cellar where the temperature does not change very much, seldom going below 40 degrees nor above 50 F., it is not necessary to have the outside entrance; but for best results the room should be darkened.

Colonies that are wintered on their summer stands out of doors need some protection where the temperature in winter goes down to zero; but the outer packing material must be protected from the rain, so that it may not soak through and then freeze. Old carpets, sacks, etc., thrown over a hive are worse than useless unless covered with a water-proof box which will keep the packing dry.

Summing up the whole question, we may say that all mistakes commonly made by beginners may be classed under two heads: First, failure to bring the colony into the right condition by the time the main honey-flow begins; second, failure to have the colony in the right condition for winter. Mistakes under the first head mean a loss of the crop; and those under the second mean the loss of the bees themselves. Both are costly, and both are preventable; and it is profitable for any bee-keeper to "go slow" in order to learn how to prevent such trouble before making a large increase in the attempt to produce larger and larger crops of honey.

A very common mistake of some *prospective* beginners is to imagine that the flowers in their back yard, consisting of a few roses, dahlias, sweet peas, etc., are going to yield enough honey to fill their hives. Such people should know that a single colony of bees requires acres of good bee forage in order to store any surplus. The ornamental flowers of the garden yield practically no nectar.

Stray Straws

DR. C. C. MILLER, Marengo, Ill.

LOUIS SCHOLL'S "Honey vs. Other Sweets," page 747, would be a fine thing to have copied in local papers.

C. A. NEAL, page 766, asks where he can buy rock candy. Sears, Roebuck & Co., Chicago, quote it at 65 cts. for 5 lbs.

D. W. MILLAR, p. 718, talks about European foul brood, and then says, "We do not consider this contagious." If it isn't contagious, it isn't European foul brood.

THANKS, Mr. Editor, for your invitation to eat pie with you, p. 746. At a banquet the talking comes usually after the feast. Let's reverse the order, and talk before cutting the pie.

A. W. YATES, those "little drops falling like rain," p. 717, were only water separated by the bees from the syrup. Don't you for a minute think bees will throw away good stuff they have once started with. [Right you are.—Ed.]

REV. GEO. W. FULLER, *Review*, 339, reports that in York State, last year, he found lice on a number of bees, each bee having from one to eight lice. Heretofore the bee-house has never flourished in this country when brought across the sea.

DEVAUCHELLE, *L'Apiculteur*, 412, fully endorses the view expressed by you, Mr. Editor, page 712, about Abbe Pincot's enlarged bees. Abbe Pincot says they are 13mm. in length, while his unimproved bees are 12mm. Devauchelle's bees, reared in ordinary cells, are 14mm. long!

J. G. CREIGHTON wants to know the origin of the first golden queen. I think Doolittle obtained his from Italians by constant selection of the brightest-colored bees. I believe others have been obtained from Cyprian or other stock—perhaps with some crossing. [If we are not mistaken, friend Doolittle was not the first to bring out the golden Italians. We hope the man who did it will speak up.—Ed.]

SOME have complained that foundation has dropped out when wedges were used. Stephen Anthony has overcome the difficulty by cutting each wedge in 3 pieces, using two of these pieces to each frame, starting about $\frac{3}{4}$ inch from each end.—*Review*, 345. [One difficulty with many is that the precaution to drive the wedge *below* the surface of the wood its *entire* length is not observed. The wedge should always go the full depth of the groove.—Ed.]

DR. PHILLIPS had barrels of slumgum attacked by moths. Just what I should expect here if the barrels were warm enough and exposed enough. But we were not talking about slumgum on p. 582. To be sure, you asked a question on that page in which I think you had reference to brood-combs; and as that has not been answered,

I'll be liberal enough to answer it here. You asked, "Is it not true that, when these combs have been frozen, after a long severe winter, they will develop the moth-worm without ever going back into the hives again if left exposed in a building?" In this locality a brood-comb that has been exposed to a winter's freezing, if left standing in the apiary in a hive without any bees throughout the summer, will not be troubled with moths one time in a hundred. My assistant says she doesn't remember a single case. I can't say how it would be in a building. But neither slumgum nor brood-combs are involved. Let's see just what is the material for that pie. I said, in effect, p. 582, "I venture the guess that S. D. House never had an egg laid in sections after they were taken from the hive—at least that, I think, is the case here." So please bear in mind that neither slumgum nor brood-combs are to go into that pie—only sections. Now I'll tell you on what I base that guess. For years I have had each year hundreds if not thousands of sections, with combs partly or fully drawn out, that were stored in the shop. The moths could easily get them if they so desired. They were put there in the fall and stayed there generally till June, sometimes through the entire summer, and I do not remember ever to have seen a single one of those sections troubled with moth-worms, and I have good eyes too. If, now, my experience is entirely exceptional, and every one else, especially S. D. House, says such sections are destroyed by worms, you needn't mind cutting the pie. I'll eat the whole of it and look pleasant while eating it. [Are you not making a distinction, doctor, without a difference? For example, what is the difference between a comb in a brood-frame and a comb in a section? Both may or may not have had brood in them. But let us assume that there *is* a difference. If you will turn back to our original statement, page 547, Sept. 15, you will see that we were talking about the possibility of moth-millers laying eggs "in his combs or in his nice comb honey after either has been taken from the hive." In your comment on this, page 582, you said sections. The natural inference would be you included in your guess combs either in the sections or brood-frames. Now, then, doctor, if the moth-miller will attack or lay eggs in combs after they have been frozen or fumigated, why should she not lay eggs in combs built in sections?

As we look at it, your proposition or "guess" will be an unsafe one to let go unchallenged before the bee-keeping public. Don't you believe there is plenty of proof now to show that it would be wise to err on the safe side—at least so far as our instructions to the public are concerned. The individual, of course, can do as he pleases.—Ed.]

NOTES FROM CANADA

J. L. BYER, Mt. Joy, Ont.

Arthur C. Miller's article on page 664, Nov. 1, is interesting; but in some things he mentions, many of us will assume the "Missouri" attitude before being convinced. Certainly cotton for fuel does not act in the way friend Miller says when used with our bees. What a good thing that we have "locality" to fall back on! As to winter temperature within the hive, outside of the cluster, being within one or two degrees the same as outside the hive, is a question, but he may be right. If such is the case, one would wonder why bees winter so much better with abundance of packing than they do in single-walled hives, in our cold climate.

If all goes well I intend to test the matter myself this coming winter, during zero weather, as some of my hives are so constructed that a thermometer can be taken from the inside of the hive without unduly disturbing the cluster.

The advisability of compensation for colonies destroyed by inspectors is a question that comes up every once in a while when the foul-brood laws are under discussion. The following, from the *British Bee Journal*, written by that well-known author, D. M. Macdonald, hits the nail fairly on the head, according to my view of the question: "I have always been an opponent of compensation in any form. Of what value, I ask, is a putrid mass of vile-smelling matter? The most rabid must admit that it is represented by a cipher. So also must be a collection of combs fast hastening to this unenviable condition. Why, the party who eradicates disease or the cause thereof is the one who should be compensated."

The foregoing may be a bit too radical, so far as heading off European foul brood is concerned, because in some cases it might be economy to the state to compensate, where slightly infected colonies were destroyed, to prevent the spread of the disease; yet, in the main, Mr. Macdonald's views are reasonable, as colonies rotten with foul brood represent no money value outside of the wax that is in the combs. On the contrary, they are apt to be even worse than useless, and a menace to the welfare, not only of the owner, but his neighbors as well.

The Ontario convention was well attended, and in every way a success. From over the line we had the different ones mentioned in a former issue, as well as Mr. Geo. B. Howe, of Black River, N. Y. The convention was strictly a *business* one, and it was a question in the mind of some if this feature was not overdone a bit. While we may argue (as the writer has often done) that details of management, etc., should be discussed in local conventions, yet the fact seemed apparent at our late convention that many come to get information who are not as yet interested in freight rates, coöpera-

tion, and a host of other questions that the more seasoned bee-keepers no doubt rightly think should be paramount. This fact was made clear by the lively discussion that followed any subject or question that would occasionally crop up concerning actual management connected with the apiary. To my mind it seems clear that we must be careful in future conventions, and not jump too quickly from one extreme to another, else there be danger of cutting out the attendance and interest at our meetings. This should never be allowed, as there is no question but that the social side of such gatherings must be taken into consideration.

It is an old saying, "All things come to those who wait;" but this fall, in our particular vicinity, the man who waited for his bees to have a flight before putting them in the cellar "got left" unless he did the work early in November.

At the east yard the bees had a good flight Nov. 6, and the 280 colonies were put inside on the 8th and 9th. Here in York Co. we had only 40 to go inside; and as the cellar is not of the best, we like to wait till late in November before putting the bees inside. On the 11th they had a partial flight; and on that day, wherever bees were outdoors, both east and west of us, they had a grand flight, as the day was warm and clear. Here with us it was quite warm but very cloudy all day. Little things like this show how it is possible for much different results in bee-keeping in localities only a few miles away from each other.

However, we waited in vain for a warm day before putting these 40 colonies in the cellar; and about Dec. 1, when the thermometer showed nearly zero, the bees were put inside without having had the flight we were hoping for. After being in the cellar for less than a week the weather turned warm, and has been warm for over a week now; and at this date, Dec. 11, all the frost is out of the ground and some plowing has been done. One day the bees outside flew nicely, and only the thought of the *heavy* hives in the cellar prevented us from carrying out those 40 for a flight. This carrying out colonies in the winter for a flight sounds all right on paper, but is a different thing in practice when the hives weigh 70 lbs. or more each, unless you get the "other fellow" to do the work. When my son and I started to carry them in we had planned carrying them out on the first warm day; but by the time we had them in the cellar we had *changed* our minds, for we felt that *two* operations of that kind are enough for a lot of bees in one season. All things considered, I am of the opinion that, for our latitude, outdoor wintering is the best, and this opinion I note is being shared more fully by many men who are in the business extensively.

Bee-keeping Among the Rockies

WESLEY FOSTER, Boulder, Colo.

BEE INSPECTION DURING 1911.

Full reports have not been received from all counties; but more than twelve thousand colonies were inspected, of which something in excess of 10 per cent were found diseased. The expense to the counties and the State has been about \$2000.



THE HONEY SITUATION.

Colorado at the present time has been about cleaned up on comb honey, but we are well supplied with extracted. The latter is selling now for $7\frac{1}{2}$ to 9 cts. in 60-lb. square cans. Comb honey sells locally in small lots at about \$3.00 per case of 24 sections for No. 1 grades. The price tends to go above this figure, as the smaller bee-keepers with but a few cases of honey are getting pretty well cleaned up.



BANKING HIVES WITH DIRT.

Some of the bee-men near Rocky Ford are banking dirt up around three sides of the hives, and they claim to have good success. The Arkansas Valley country is very dry in winter, and this method might succeed there when it would fail almost anywhere else. The objections to this method are that the hives would tend to be dampened by the dirt, and then the hives and bottoms would be more subject to decay. Otherwise this wintering method might work all right.



A STARTERING-MACHINE.

Mr. D. S. Jenkins, of Las Animas, is the inventor of a machine which will cut, and in one operation insert in a section honey-box, a starter of any desired size. The Las Animas bee-keepers in that vicinity who have used it have discarded every other make, whether a combined machine or not. His is simplicity itself, and does not cost 25 cents for material. Mr. Jenkins has made and sold several for \$2.50 each. He uses an auto in his bee-work, and this, too, is largely of his own manufacture. He says one has to become accustomed to the machine for starting sections before being able to use it successfully.



TALKS ON BEES AT THE PUBLIC SCHOOLS.

The Colorado Agricultural College is conducting a series of farmers' institutes in the Arkansas Valley, Colorado. The writer is giving talks on bee management and foul brood at the institutes, and on the habits of the honey-bee, before some of the high schools and public schools. Courses in agriculture and domestic science are being carried on in many of the schools, and these classes are especially interested in the honey-bee and its product. In some places the whole school is dismissed while our corps of speakers are in town, and in other places we go to the schools and speak there. Institutes are being held at Wiley, Lamar,

Las Animas, Cheraw, Rocky Ford, Swink, La Junta, Fowler, Boone, Fountain, Sugar City, and several other towns.



WHAT OF THE NEW YEAR?

Some time ago my wife was looking through the bee-journals, hunting for her husband's bee material and remarks thereon by the other correspondents, when she said, "You bee writers don't do much else than nod back and forth at each other in your departments."

It struck me as being rather apt, even if my wife did say it. The reason, no doubt, is principally because of lack of better material. Each one of us who tries to keep his department going should have an experiment station in operation to furnish actual results as a basis for his results. It would do away with a lot of guesswork and mere ideas on certain subjects. But as we can not do this except as our own apiaries are experiment stations, we shall have to keep right on in the way we are going, with a constant endeavor to improve our methods and the material we furnish.



COLORADO BEE INSPECTION IN 1912.

Plans are being made to do thorough inspection in every county in Colorado where bees are kept if the county commissioners will set aside enough money to pay a county deputy inspector to work under the direction of the State Entomologist's office. Most of the counties are coöperating in this way; and if all will help, great good can be done. The bee-keepers in each county not having a local inspector should call a meeting of the bee-men at some time when the commissioners are in session, and appoint a committee to see the commissioners or else have the bee-keepers see them in a body. The writer, if notified, will gladly meet with the bee-men and take up the matter with the commissioners, explaining the way the new law operates, and the means of getting the most benefit from it. It is important to get this started soon, as the commissioners want to know some time in advance as to the expenses they will be called upon to vote for different kinds of county work, and the bee-keepers should not be at the tail end of the appropriations. The State funds are not sufficient to keep me in the field more than six or seven months; and when there are a dozen or more county inspectors at work the office work takes a great deal of time. However, I shall be able to put in one or two weeks in each county, working with the county deputy inspectors.

Let us all make an extra effort to get foul brood under control in Colorado. It can be done if we make an extra effort. In the future our work will consist in seeing that cleaning up is done. Inspection avails nothing if treatment is not given promptly.

Conversations with Doolittle

At Borodino, New York

THE APIARIST'S USE FOR AN AUTOMOBILE.

"Did you see the editor's request, page 709, December 1, that those having automobiles tell something of their experience with them in bee-keeping for the benefit of the GLEANINGS family? If I am correct, you were one of the pioneers in using the auto in connection with our industry; and as I am thinking of purchasing one I should be pleased to have you tell us about it."

"I bought my first automobile in June, 1903—a 3½-horse-power Pierce motorette. Automobiles were then in their infancy; yet this little machine could climb any of our hills, carrying a load of 400 to 500 pounds. As it was not intended for any thing but carrying two persons, I made a rack to fit on behind the seat; and with this, and the seat Mrs. D. occupied when both of us went, I could load on 350 lbs. of honey, or as many hives or supers as would stay on when going and coming to or from the out-apiary, five miles away. As I then weighed from 260 to 270 lbs., it will be seen what a power there was in that little 3½-horse-power motor. In September, 1905, I sold this motorette, considering it too small for my use with the bees; and as I was so well pleased with the material and workmanship I bought another Pierce car, this having a folding seat in front. This was styled an 8-horse-power Stanhope; but to show its power and capacity I will say that I have carried four grown persons and six children in it, besides myself, at Sunday-school picnics, and, at other times, from 600 to 800 lbs. of crated section honey, to our railroad four miles away, over a hilly country, when shipping my honey to the New York market. By opening up the front seat I could pile on nearly as many hives and supers as could be drawn by wagon, and take them to and from the out-apiary in less than half the time required to traverse the distance with a horse. Those having GLEANINGS for August 1, 1906, can find a picture of me with my load of supers just arriving from the out-apiary.

"But the great beauty of the automobile for the bee-keeper consists in the driver having perfect control in all of the essentials of apiary work. With my auto I can drive right into the bee-yard; and with the distance I have between the rows of hives, the auto can be brought right up to the back side of any hive; heavy supers, freed from bees by the use of the bee-escapes, set right from the hives to the auto, with a carrying swinging motion, with scarcely a bit of the lifting needed when loading on a wagon, as the auto is of about the same height as the supers on the hive. The motor may meanwhile be left running slowly, so that moving on to the next hive is only a matter of touching a lever; and in a very few minutes the load is on, the hives closed up in good shape, and we are off, without a sting or any worry from the bees whatever.

"Then the driver of this load of precious sweets is always master of the situation, if he is a capable driver, no matter what he meets on the way home. Once a hog was the cause of frightening my horse, and again a traction engine, so that it was only by a hair's breadth that the load of honey was not demolished. The auto never shies nor gets scared, no matter how many ghosts jump out in unexpected places.

"Another thing which really gives me lots of comfort is, the flies never bite and torment the auto, as they are sure to a horse during the season for moving honey. This season is always in fly time; and to control the horse when flies are very troublesome is not always the easiest thing to do where the road is very rough and stony; and a horse often gets its tail over the lines in the fight to relieve itself from these tormentors. It is needless to say that the auto overcomes all of these many difficulties.

"The auto can be made to go at snail's pace where the load requires the most careful driving, and, where good, a fifteen-miles-an-hour jog is just as safe and reasonable as the former. Thus a load can be moved with an auto, without tying or binding when moving, which is always a safe precaution with a horse and wagon.

"Another thing about the auto which pleases me nearly as much as does driving it right into the middle of the apiary, without fear of stings or the unhitching of horses, is this: After finding what this auto would do I built an auto store-room, honey-room, and small workshop combined, with movable partitions, painting the same a dark color so as to ripen the honey when stored therein through the heat brought about by the absorption of the rays of the sun. Now, instead of having to carry the honey from the wagon to the honey-room, the auto load of honey is run right into the honey-room. This saves a whole lot of lugging which was necessary with each load when returning with the horse-drawn wagon. Again, when marketing with horse-power the crates of honey must be carried from the honey-room to the wagon standing outside, and the load, when completed, securely tied or bound on, owing to the smooth surface of the nicely polished cases. The auto is backed right into the honey-room, between the piles of nicely crated honey, when, with the swinging motion, the honey is conveyed from these piles into the auto; and when the load is on, the driver pulls the lever, and he with the load moves right out from the honey-room to the railroad station or car conveyer to where it is consigned.

"To save any tying when carrying polished cases of honey to market, I have properly shaped pieces of lumber put in the auto where needed, to give a very slight tip or pitch toward the center, so that all crates will gravitate toward the middle of the load, which is even better than tying."

General Correspondence

WHAT A LIFETIME OF EXPERIENCE HAS TAUGHT ME.

Some Advice for the Especial Benefit of the Beginner.

BY ISAAC F. TILLINGHAST.

Born on the even half-century mark, January, 1850, it is now over sixty years since I first opened my eyes to the beauties of this diversified world, and began the study of nature. Among my earliest recollections is a row of Week's patent hives. My father kept them in his front yard suspended between horizontal pieces of scantling attached to posts, the lower end of each hive being cut on a slant, and its bottom-board suspended at each corner by a wire hook, the idea being to facilitate the removal of litter of all kinds, and to prevent the bee-moth from gaining entrance. At the top was a surplus-honey chamber, about one-fourth the size of the brood-chamber, opening at the side, and furnished with two square surplus boxes, each having glass ends in front, and four communicating-holes through which the bees entered from below. These boxes held about ten pounds each of comb honey; and whenever a colony filled them during the season, it was considered a record or maximum yield.

As soon as old enough I began to take charge of the bees, and to study their habits. I bought and read the works of Quinby, Kidder, King, Langstroth, and others, and subscribed for the *American Bee Journal*, for which I became a frequent contributor in the early seventies. Quite recently I purchased a copy of Dr. Miller's "Forty Years Among the Bees," and was surprised to note that he gives me the credit of being one of his early teachers. In those days I thought I knew it about all; but a half-century has passed, and I am still learning.

Being fully convinced of the superiority of the Italian race of bees, I bought my first queen of father Langstroth, successfully introduced her, and kept her for several years. I closely read the exploits and achievements of "Novice," in the *Bee Journal*, and well remember the first issues of GLEANINGS. Yet bee-keeping was never my main business. For twenty-five years I was editor and publisher of *Seedtime and Harvest*, in which I maintained an apian department, conducted by James Heddon, yet gave most of my time and attention to growing and selling seed.

During the last ten years I have traveled quite extensively throughout the Union, and have visited many of the most noted bee-keepers. At the same time, at home I have kept more bees and produced much more honey than I ever did in my younger days.

WHY KEEP BEES?

First, because the honey-bee is one of the

cogs in the wonderful mechanism of nature, and is as necessary to the successful production of fruits as are the birds and showers. Nectar was placed in the flower by the great Designer to attract the bee, for the purpose of carrying the pollen from the stamens of one blossom to the pistils of another, in order to cross-fertilize them and render them fruitful. It is a mutual arrangement. The bee is for the flower as much as the flower is for the bee; and the very life and existence of many kinds of fruits, vegetables, and other plants, depend as much upon the bee as does the life of the bee upon the flowers. The bee-keeper is, therefore, a public benefactor.

Secondly, there is pleasure and profit in bee-keeping if conducted by modern methods; and as a hobby or diversion for business men I would place a few colonies of bees far in advance of chicken-raising or any other outdoor home industry.

I believe that there are few localities where many more bees could not be profitably kept; and the amount of honey that is continually going to waste all over this country, if known, would fairly astonish the world. Indeed, it could easily be proven that the honey-flows, as they come along from different sources, are far more abundant, yet perhaps shorter in duration, than most people suppose; and a knowledge of this fact, coupled with ability and proper facilities for caring for them at the proper time, constitutes the greatest factor of profit on the part of the up-to-date bee-keeper.

It is my purpose to show how to manage bees so as to secure the proper share of this great waste. In proof of the assertion just made, that in few if any localities are there bees enough to secure all the honey that nature so lavishly supplies, let me cite the case of Mr. E. W. Alexander, of Schoharie Co., New York, who, for several years before his death, kept an average of 750 colonies of bees in one yard, all on about one acre of land. By knowing the nature of his field, and about when to expect the honey-flows from different sources (buckwheat being his most important one), and by seeing that each colony was supplied with empty combs at the critical moment, when needed for storage, he succeeded in securing an average of over one hundred pounds of extracted honey per colony, the aggregate of which would amount to over 37 tons. Now, if it was possible for this great amount to be gathered from within the area of a circle covered by the flight of one bee, whatever distance that may have been, how much do you suppose may go to waste, for the want of bees to gather it, in thousands of other localities where not even one hundred pounds is secured and saved within an equal area? Are not the possibilities great enough to warrant a study of this subject, with a view to determining what may or may not be accomplished along this line in your lo-

cality, or in selecting some other locality where you may profit by the knowledge you may gain?

Why you should *not* keep bees may now be considered in order to ascertain whether the objections can match or overbalance my affirmative reasons. First, no doubt you will admit that a fear of stings is your greatest objection; and, secondly, perhaps you imagine that some large trees surrounding your premises might be selected by the bees as alighting-places, thus causing you too much trouble in hiving swarms. Let me assure you that both of these objections can be almost entirely overcome.

By the use of a little smoke, the crossdest and most irritable colony may be made gentle. A whiff of smoke blown into the hive frightens the inmates, and they at once proceed to fill themselves with honey. If there is no unsealed honey readily attainable, sprinkle them liberally with sweetened water, which they will take instead, and, like a man after dinner, they are invariably better-natured when filled than when empty. And then when obliged to open a hive, a pair of gloves and a bee-veil over the face will prevent your being made a target by some mischievous scout. Another curious fact is that, after you have been stung a few times, your system becomes inoculated to the poison, and you rarely observe any unpleasant effects, such as the closed eye that the tenderfoot may be likely to suffer.

In many localities there are not bees enough to fructify properly the blossoms of fruits and vegetables. Most bee-keepers now prefer to get their increase by artificial divisions rather than by natural swarming, as thus it may be done at one's option and convenience, and most of the risk of absconding swarms may be eliminated. It is only necessary to keep the wings of the queens clipped so they can not fly, and you will have the whole colony under perfect control. Should they attempt to swarm, you may make them literally hive themselves instead of alighting in some tall tree.

To accomplish this, as soon as they are in the air remove to a short distance the hive from which they issued, and place an empty one in its stead. You will find the old queen on the ground in front, vainly endeavoring to accompany them. Secure her in a cage and wait till the swarming bees have missed her. They will probably begin alighting in a cluster; but finding that not all is well with them they will soon proceed to return whence they came, and will thus be made to enter the new hive. Now liberate the queen at the entrance; see that she goes in with them; and as soon as all are in, move them to any desired situation, and place the old hive on its original stand.

When bees prepare to swarm they make provision for themselves for the journey by filling their bodies with honey; and when in that condition, as above stated, they may usually be handled with impunity. In early spring, when examining our colonies we clip the right wing of each queen if she

is not already clipped. The next year we clip the left wing, and the third year both wings. This marks their age up to three years, which is as long as or longer than it is usually profitable to keep them, and it prevents the possibility of swarms absconding to the woods.

WHERE BEES MAY BE PROFITABLY KEPT.

There are few locations where bees may not be kept either in country, village, or city, as they will go three or four miles if necessary for food. In the writer's locality they start in early spring on the maples, the soft and hard varieties following in succession, and lasting two or three weeks. Then follow dandelion, fruit-blossoms, red and black raspberries, locust, white clover, basswood, sumach, milkweed, catnip, Canada thistle, goldenrod, buckwheat, wild aster, and a score of wild flowers whose names are not familiar, thus covering the season. During the height of flow from each of these sources the secretion of nectar is very abundant but of short duration. To secure it, the flower must be visited many times in a day, and an immense number of bees are required to keep it from evaporating and going to waste.

Yet while it is true that in only a few localities are there bees enough to secure and save more than a fraction of what nature so bountifully supplies while these flows are on, there are often long intervals between when there is little or none to be had, so I believe it would pay most bee-keepers to consider whether nature may not be aided by planting something which will fill up these interstices and keep the bees more constantly employed, and, at the same time, produce a crop which will pay its cost besides the honey.

For this purpose I would recommend buckwheat, raspberries, alsike clover, mustard, and rape, for this section. Melilotus, or sweet clover, where it has started, reseeds itself and spreads naturally, and is, without doubt, one of the very best honey-producing plants known.

The chief value of sweet clover as a honey-plant comes from its habit of long duration of bloom, so it is sure to bridge over the gaps left in the succession between many other plants named. It is a great soil-improver, and it has been found that it prepares the way for alfalfa by inoculating the soil with the bacteria necessary for its growth. On this account the demand for its seed is increasing, which will no doubt make it a paying crop without considering its value as a honey-producer.

HOW TO PROVIDE PLENTY OF ROOM AND PREVENT NATURAL SWARMING.

The most important secret in bee-keeping is to see that strong colonies are well supplied with empty combs, so that the bees may store quickly while the abundant flow lasts. This is accomplished by the following process:

As early in spring as we can get the queen to fill the hive with brood we remove all the combs but one, on which the queen must be

left, and put in their places either empty combs or frames of comb foundation. Then we put on a queen-excluding honey-board, and above it another body, uniform in size, in which all the removed combs, together with the brood and adhering bees, are placed. A $\frac{3}{4}$ -inch entrance and exit hole should be made in the upper part; for as fast as these combs become empty by hatching brood, the bees will proceed to fill them with honey, and they soon learn to use this upper entrance and save much time by its use. Besides, it gives ventilation and allows the expulsion of drones, which otherwise might clog the excluder, and smother the inmates of the upper story.

The queen being confined to the lower story she has plenty of room to go on with her egg-laying, and she will soon have it filled with brood, thus making faster increase in numbers and strength than otherwise would have been possible, and the increased room given just at this time will usually dispel any intention or tendency to swarm.

The main advantage given by this system lies in the fact that the bees will invariably proceed to store quicker and more abundantly in this upper story than they can be induced to do in supers of sections arranged for comb honey. But in this case, of course, this honey must be removed by extracting, and this explains why much more extracted honey may be produced than sections of comb honey.

This also affords an excellent opportunity to produce some young queens. When the division is made, place over the excluder, for twenty-four hours, a complete cut-off, consisting of a sheet of wire netting, or even a cloth or heavy paper. This renders the bees above actually queenless for this short period, which causes them to start queen-cells freely, which they will continue to care for after the cut-off is removed, and these may be cut out and caged, or given to other colonies or to nuclei on the tenth day, and without any loss of time on the part of the bees or breeding queen.

Do this only with the best breeders, and put a nice sealed cell in a cell-protector, in place of the black, hybrid, or old and questionable queens, and you will requeen with as little expense and waste of time as is possible. These young queens are always accepted whenever they hatch within a hive, and you are saved the trouble and risk of introducing queens. Then, even if some of these should mate with black drones, if bred from a pure-blooded mother their drone progeny will be pure next year, when the operation may be repeated with chances of mismating greatly diminished. Young vigorous queens, raised from selected mothers, are a strong factor to success in bee-keeping.

The process described above has also proved with us a complete cure for European foul brood, the infected combs being cleaned out and filled with honey, and the queen compelled to use only new clean combs for brood purposes.

Factoryville, Pa.

THE SWARMING IMPULSE NOT CAUSED BY ANY ONE CONDITION.

BY R. F. HOLTERMANN.

In my estimation the swarming problem will not have much light thrown on it by efforts to confine the causes under one head. I have no doubt that the control of swarming, or, rather, the prevention of the desire for swarming, in powerful colonies, without reducing the numerical strength, either at the moment of or during the future of the honey-flow, is the capstone of successful bee-keeping.

The successful solution of this problem makes it possible to keep more colonies, to have them scattered, to take a honey crop with less labor and anxiety, and to get a larger surplus crop (if there is a surplus) than can be obtained through swarming. From this I except a tropical country with a honey-flow the year round; but I do not except in our own country an average year with a light and dark honey-flow no further apart than clover and buckwheat. In many localities keeping down swarming makes possible more successful and uniform wintering as well as, in some seasons, the difference between a honey crop and a failure.

VARIETIES OF BEES.

With the black or German bees, Italians, Carniolan, Cyprians, and Holy Land bees there is a marked difference as to disposition to swarm (I will not include Caucasians, as I am acquainted with them only by hearsay and sight. I can not find that they have any superiority over Carniolans. Even a breeder of Caucasians privately advised me to stick to the Carniolans). Of all the varieties mentioned, the Holy Land and Cyprian bees are the most prone to swarm. I know of what I write, for I spent two years with D. A. Jones, of Beeton, Ontario, when these bees were first imported into America. The Italians, as a variety, are, perhaps, on the whole the least inclined to swarm. But the bees the least apt to swarm are not necessarily the best for the bee-keeper *who can control swarming*.

CONTRACTED ROOM.

My first attempt to keep Carniolan bees was an overwhelming failure. It was in the days of eight-frame Langstroth hives, and with the contraction of the brood-chamber for comb honey, which is something Carniolans will not stand, I found that it was useless to attempt to keep these bees for profit under such conditions.

SMALL ENTRANCES.

I have had a colony of Carniolan bees swarm when they had only about half filled a twelve-frame Langstroth brood chamber having eight combs, and two of these yet empty, and they were headed by a previous autumn's Carniolan queen. A careful study of the conditions did not reveal superseding nor any thing else, except that we had hot weather while the bees were packed, and they had a very small entrance on account of the fact that the colony had been only a

nucleus the preceding fall. By dear experience I have learned that Carniolan stocks are exceedingly liable to get the swarming impulse during fruit bloom if they do not get plenty of ventilation; and in the past some of my Carniolans have had the swarming impulse before I thought they were really crowded enough to need supers and large entrances, especially in view of the future break in the flow. Italians, hybrids, and blacks, equally strong, did not get the swarming impulse under like conditions. Excess of nurse bees could not be the cause of swarming at this time, for it would be unreasonable to suppose that one colony has any more young bees in proportion to brood than the other. In fact, during the building-up process the proportion of brood to bees is on the increase; and with a good Carniolan queen there is all the brood the bees can look after.

WHEN THE DANGER.

My experience fully supports the following: The time for the greatest danger of swarming with strong colonies is during the light honey-flows before the heavy surplus flow sets in, and during idle time between heavier flows.

When the bees are about ready for super room is a most critical time. I put supers on the hives too early rather than too late; and as I generally keep the bees packed in their winter cases until the clover begins to yield nectar I run no danger of chilling brood.

If during a good honey-flow the bees enter the supers with a rush, I find but little trouble, under right management, until the super room begins to be crowded *for the process of ripening* the stores they gather from day to day. I do not recollect ever having a twelve-frame Langstroth hive with three, four, or five supers on top of it wanting to swarm. We are told that in tropical countries during the heavy flow the bees abandon swarming; and when the light flow follows they get the swarming impulse. I believe it is much the same under proper management in more northerly localities.

The trouble does not lie solely in the lack of super room. Neither is it a lack of ventilation alone, nor in hive conditions alone, as then all the varieties of bees and all colonies would swarm under certain conditions. This much is plain—that, within recent years, there are those who have learned so to manage that the bees will bend their energies in the direction of gathering honey rather than in swarming.

Brantford, Ont., Can.

DISTURBING BEES DURING WINTER.

Was it a Costly Mistake?

BY G. T. WILLIS.

Robert B. McCain, Nov. 15, page 685, says regarding the advisability of opening hives in the winter time in order to ascertain the condition of the food supply, "The proba-

bility is that the bees will be injured rather than helped by disturbing their household affairs." Now let me emphasize this to the inexperienced bee-keepers. Don't allow yourself to be so overcome with curiosity that you can't leave the bees alone. If you do, you will never forget it. Josh Billings, the pithy writer of years ago, uttered this wise and truthful sentence: "Experience teaches a good school, but the tuition is rather high." Well, I have attended that school myself, and I paid the tuition in full. For fear that some one may be tempted to commit a similar blunder I will give my experience of twenty-seven years ago.

In the fall of 1884 my 38 colonies, in ten-frame hives of my own make, were all in fine condition for winter, as there were plenty of bees and stores. The hives were so made that there was permanent packing at each end; and when preparing them for winter I took out two or three frames and put a follower on each side and packed with straw, both at the sides and on top of the frames, which I considered an ideal condition for wintering. Old residents remember that, during the winter of 1884, an unusual amount of snow fell, and it was cold from the second week in September till the last of March, so that the bees were buried under the snow most of the time. As I was engaged in the work of the ministry I was away from home much of the winter; but on returning the last of February I remained a few days. The 28th of February being a bright and warm day I did the very foolish thing of opening hives containing those 38 colonies to satisfy my anxiety as to whether they had stores sufficient to last them until spring. Now for the sad experience that cost me so dearly. When I returned and examined them early in April, I had only seven colonies left. I have never, in the twenty-seven years since, allowed myself to be tempted to inspect a colony in winter.

I may have something to say at some future time as to how I succeeded the following season in retrieving my loss.

Hoopeston, Ill.

[We believe our correspondent is wrong in supposing that the opening-up of his hives on the 28th of February, a "bright and warm day," was the cause of the heavy mortality among his bees. While it is certainly bad policy to open up outdoor colonies on cold days, causing the clusters to expand beyond the point where they can keep warm, it seldom does any harm when the air is warm enough so the bees can fly. If, however, the colonies have been well supplied with stores during the previous fall, it is advisable for beginners, at least, to let the bees entirely alone. However, if there is any doubt about the amount of stores, we recommend opening up the hives when the weather is warm enough so the bees can fly, and then put rock candy or a comb of sealed stores on top of the frames after very gently lifting the cover and the packing, and replacing the same.—ED.]

EXAMINING A COLONY OF BEES.

BY F. DUNDAS TODD.

[However familiar the experienced bee-keeper may be with the details as told in this article, we feel sure that the points mentioned will prove of interest and value to the beginner, for whose benefit they were especially intended.—ED.]

It is always good policy for the beginner in bee-keeping to see an experienced hand manipulate the frames of a hive before he tackles the job himself, because it will give him confidence, helping to overcome the instinctive dread of stings. He will learn by observation that, when handled skillfully (and this word in the present connection really means *gently*), most bees remain quietly on the frames, and are no more dangerous than so many flies. Worker bees are constituted of high nervous tension, and will not tolerate with equanimity a sudden jar or shock of any kind; therefore all movements must be easy and gentle if one desires them to be in good humor. In his dread of stings the novice is apt to rush things and be jerky in his movements, and so bring about the very condition he least desires—an irritated, pugnacious community. It is not wise to depend upon smoke to quell an insurrection. The true rulership consists in avoiding the beginning of strife.

Here are a few simple rules that are worth following while working with bees:

1. Never stand in front of the hive entrance, for that is the bee's roadway. You will soon get notice to move; and if you fail to comply, stinging will be attempted.

2. Never put a frame nor any other part of a hive in front of the entrance.

3. Leave all frames in the same order in the hive as you found them, and turned the same way.

4. Make every movement slowly and deliberately, never dropping a frame into position, but placing it exactly where it belongs.

5. Avoid, if possible, killing a single bee; for among communists, whether human or not, an injury to one is an injury to all, and must be avenged. Kentucky feuds are a lingering remnant of the Scotch clan spirit among the descendants of the Highland exiles of the eighteenth century.

It is possible you do not have a neighbor to give you the first lesson, so I will invite you to come to my yard and examine with me a hive; and since you can not be with me in reality I will bring my camera into play and illustrate each feature that may be worthy of notice.

First, we get the smoker agoing, then put on our bee-suits. All being ready we stand alongside the hive, which will appear as in Fig. 1—that is, if it is an eight-frame Langstroth, which this happens to be. Its cover is rather different in design from those in general use; but it is popular on this side of the Pacific coast where we have long-continued winter rains, and only short spells of severely cold weather. Notice that the bee-keeper is standing on the sunny side of the

hive so that, when he comes to examine the frames closely, the sunlight will strike into the cells.

We will begin by removing the cover, see Fig. 2; and when we do so we find a piece of cloth underneath. This is known as the quilt, and is usually made of table oil-cloth with the glossy side down, as the bees have a habit of carrying out any fabric they can tear to pieces. The purpose of this cloth is to retain the heat of the hive, for reasons that will be seen later.

The cover of your hive is probably a flat one; and when you try to take it off you may find it fastened down tight. Very likely the bees have cemented it all round to the body with propolis—a kind of glue—and we must break the bond. So we force the hive-tool under one corner of the cover and give it a twist; or, press your left hand firmly upon the center of the cover, and at the same time pull up one corner with the right.

The cover is set to one side; then we take the quilt by one corner and peel it off. We now see the tops of the frames, from between which, if it be late spring or summer, thousands of bees are appearing and covering the upper part. Fig. 3 shows how the hive will look at this stage.

Bees are much like people. Some are good-tempered and some are not. Any one keeping bees as a hobby is foolish to have any of the vicious kind, more especially if he is surrounded by near neighbors. The best working bees in my own yard are so gentle that I rarely have to use smoke on them. But I have had colonies so vicious that they attacked any living thing coming within ten yards. The queens at the head of these colonies soon ceased to exist, being replaced by others from a less pugnacious strain. So when we remove the quilt we have a chance to learn something about the temper of the insects in this particular hive; for if they are good they will stay quietly on the combs; but if bad they will run around and fly off—some at us, and some to the hive entrance. Now is the time to use smoke to keep them in subjection. How much, will depend on circumstances; but never more than is necessary. With the average hive it is usually enough to give a few puffs across the frames, never down through them, as the quilt is being peeled off. In the case of a colony known to be irritable, it is usually necessary to give a puff or two into the hive-entrance before removing the cover. In spring and autumn, when the colonies are weak in numbers, it is often unnecessary to use smoke.

In the eight-frame hive we are examining, the inside width is $12\frac{1}{2}$ inches; but the frames occupy only 11 inches of that, so there is a free space of over one inch on one side of the frames. Part of this is filled by a "follower" made of a thin board. Occasionally this is called a division-board. In use it is pushed tight against the last frame.

Our first work is to remove the follower that occupies the space between the frames

and the side of the hive. Very probably it will be glued to the frames with propolis, so we insert the hive-tool between the frame and follower, pushing aside the bees gently if in the way; then with easy pressure we pry the board apart from the frame, first at one end then at the other. The follower is now removed from the hive and set to one side, or at the end of the hive. We can now reach the first frame, which is apt to be clear of bees, excepting from May to September. As before, we break the glue adhesion with the hive-tool, then lift the frame with both hands, one at each end-bar. Should bees be clustered where fingers will grasp the top-bar, gently puff a little smoke on them and they will quickly scurry away. Remember, it is little tricks like these that make hive manipulation easy and prevent the bees becoming ill-tempered. Lift the frame straight up, with your back to the sun, and proceed to examine it. Fig. 4 shows the operation. (The editor will, perhaps, permit me to explain here for the benefit of Dr. Miller, who may in this and following illustrations see a chance to catch hold of my short hair, that in making these photographs I had to choose be-



FIG. 1. — Ready to begin work at hive No. 1.



Fig. 2.—Removing the cover.

tween good photography and good bee-keeping. The former called for lighting, as is shown in the preceding pictures; but I felt that, with the others, the lighting ought to be in harmony with the instruction that was being given. Even after this explanation I feel the good doctor will trip me up.)

The inside of the frame, we find, is filled with wax comb, which is made up of a great number of cells—at least 3000 on each side. In these cells is stored the food supply of the colony. In them are laid the eggs from which develop the young bees, the whole time from infancy to maturity being spent in such narrow confines. Then in the cold days of winter, when all activity in the hive practically ceases, when the individual members huddle close together to keep each other warm, each empty cell may be filled with an insect, so that no space shall be unoccupied. The interior of a hive is a wonderful utilization of a limited area, down to the minutest detail; and it is hard for most people to realize that, in a capacity of about two cubic feet, as many as 50,000 bees will carry on all

the activities of their life, for here is at once a pantry, kitchen, incubator, nursery, living-room, and bedroom for them all.

But let us investigate our comb a little more. First we shall probably notice that there are at least two different sizes of cells—one series in the upper part of the frame, running about five to the inch; another kind, generally in the lower half of the comb, that are a little larger, running about four to the inch. In the smaller cells the worker bees are raised; in the larger ones the drones, which are the males, spend their days of infancy. Both kinds of cells are used when necessary as storage for food. In a well-managed hive the worker cells vastly predominate; in fact, all good bee-keepers strive to keep the drone-cells to the lowest possible number. Drones are essential to the welfare of the apiary; but an unlimited quantity of them means a waste of valuable space and food, for they are consumers only. Fig. 5 shows the two kinds of cells side by side.

We will now proceed to examine the next frame; but first we will dispose of this one by setting it on the ground, leaning it against the side of the hive. As before, we will break the gluing between the frames. Since it is May it is probable the colony is strong enough to cover six frames, so that this one may have thousands of bees on both sides, while the weight suggests that the cells contain something. They do, for the center of the comb is filled with young bees in all stages—eggs, larvæ, and sealed brood. These are surrounded by a band of

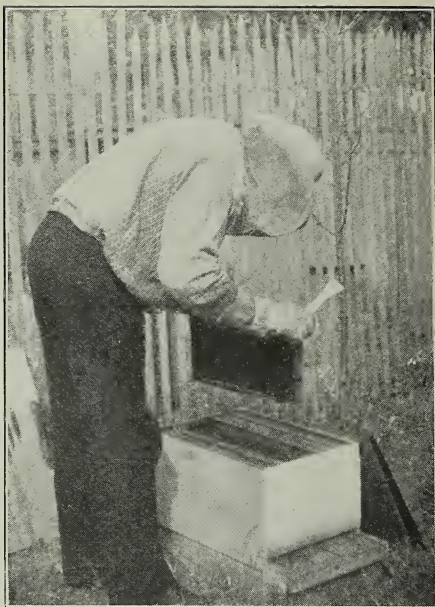


FIG. 4.—Lifting out the first comb.

pollen, about an inch or two wide, while outside of that, especially at the top and ends, is honey—quite a neat arrangement, you see, so as to have every thing handy—nursery in the center, with the food all round about. But, stop a minute. All the other frames are arranged exactly the same way; so think a little, and you will realize that the brood-nest is a ball, with, of course, the most brood in the center frame, the least at the sides. Now you will understand why you should not disturb the order of the frames when you examine a hive, as changing the arrangement will upset the brood-nest. If you never set more than one frame outside of the hive you will avoid the chance of misplacing the frames.

SHAKING BEES OFF THE COMBS.

May be the comb is so thickly covered with bees that careful inspection is impossible, in which case hold the frame above the hive; raise it slowly about a foot, then lower it quickly, finishing up with a sudden jerk, when practically every insect will drop on the frames below.

Fig. 6 shows the position of the frame at the end of the operation. It is not considered wise to shake the queen off the combs at the season when she is laying heavily. Another way, which I prefer, is to hold the frame perpendicularly by the end of the top-bar with the left hand, then with the right hand clenched hit the left a smart blow from above (Fig. 7). The comb being free from bees, turn your back to the sun

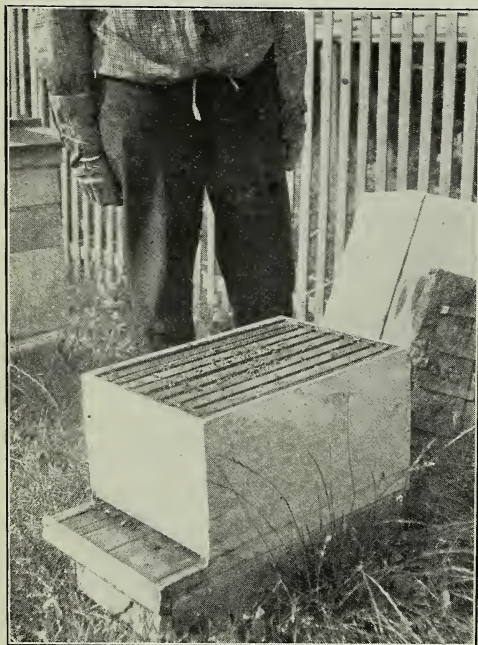


FIG. 3.—The quilt removed.

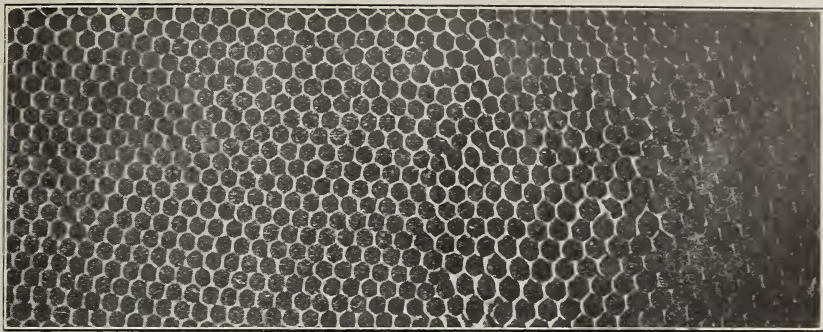


FIG. 5.—Worker and drone cells side by side, showing the difference in size. The former measure five to the inch, while the latter run four to the inch.

so that its rays may shine into the cells. Along the upper part of the frame, and at the ends, the cells will probably be all sealed, the cappings (as the coverings of the cells are called) being flat, or often slightly sunken, and wrinkled, and generally semi-transparent. Such sealing indicates the presence of honey. On the edge of this region there will likely be a narrow belt of unsealed cells showing the honey, indicating that the bees are using up their stores to feed the young. When we reach the bottom-board in our investigations we shall find lying there a brownish-looking deposit, like coarse dust, but which is really the fragments of comb-capping torn from the cells.

POLLEN STORES.

Next to the open cells with honey often comes a narrow band of cells filled with a brownish-colored solid substance. This is pollen, or bee-bread, which is the male element of plants, and forms part of the food of the young of the bee while in the larval or maggot stage.

THE BROOD-CELLS.

In the center of the frame we find the brood in all stages—eggs, larvæ, and cocoons. The last are sealed over, just as is the honey, with this difference, however, that the cappings are dark-colored, and slightly raised in the case of worker brood—decidedly so with drone-cells. The larvæ are easily seen, coiled up in the bottom of

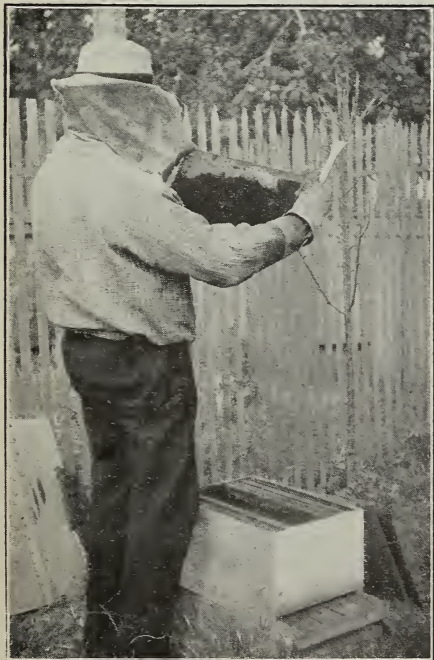
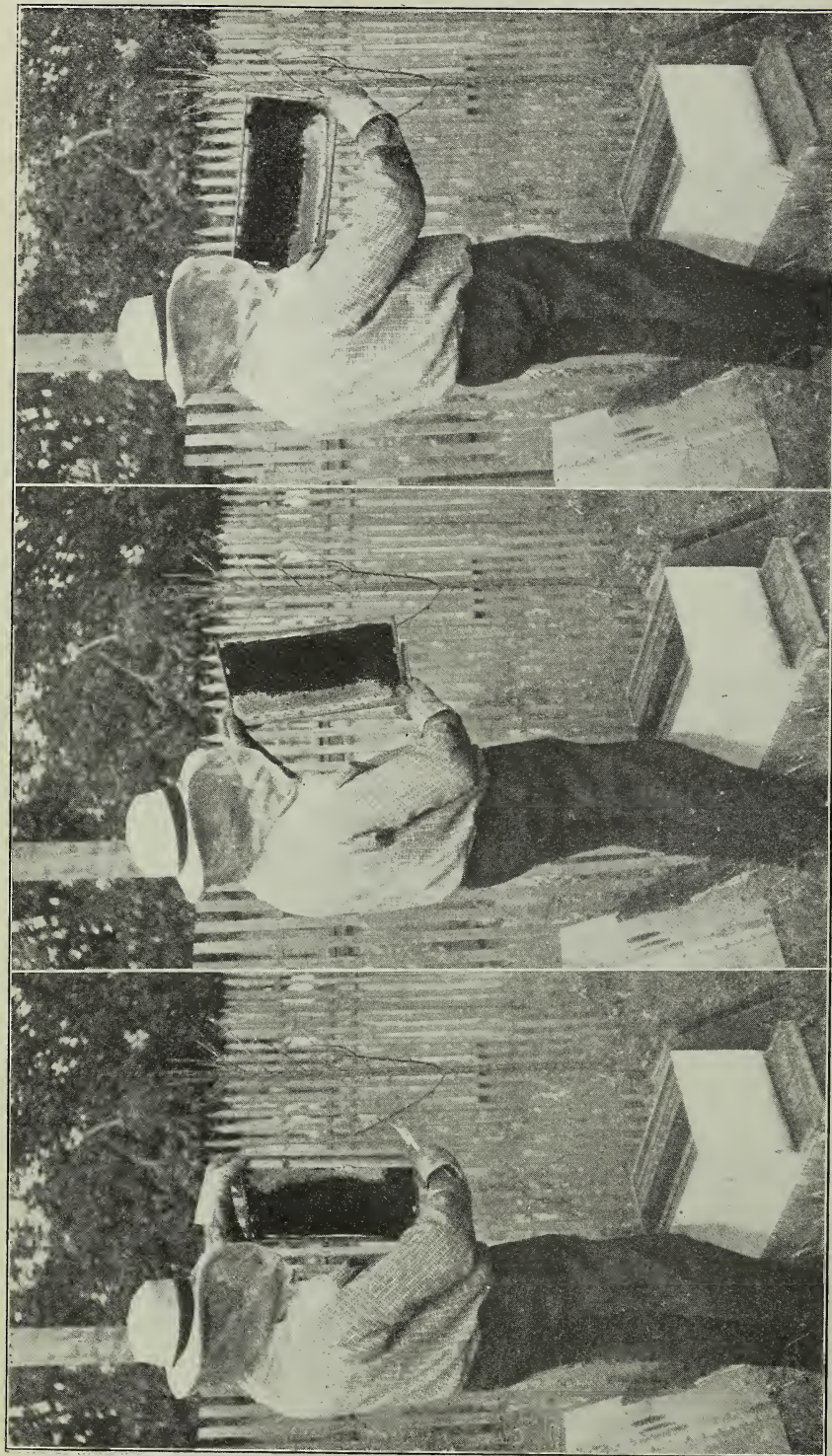


FIG. 6.—Comb cleared of bees for inspection.



FIG. 7.—The best way to jar the bees from the com



FIGS. 8, 9, 10.—Various positions of holding a comb, showing the manner of turning it in such a way that it is always supported, thus avoiding the danger of a heavy comb dropping out of the frame.

the cell, especially after they are three days old; but the eggs are harder to distinguish on account of their small size; in fact, they look like very short bits of white thread attached to the far end—that is, the bottom of the cell. It is just as well for the beginner to learn to detect the presence of eggs in the comb, for an evenly arranged patch is pretty good proof that the queen has been busy.

HOW TO REVERSE A COMB.

A frame has two sides, so you had better look at the other one too. Your most natural impulse will be to cant the frame over; but don't do so; for as you tilt it up to the level the weight of the comb is apt to break it away. Try it thus: Lower one hand, say the right, until the top-bar is perpendicular (Fig. 8); turn the frame half way round, using the top-bar as a pivot (Fig. 9); then raise the hand that was lowered (Fig. 10). Your frame is now upside down, with the second side toward you. Here is another method that can be carried out without a pause: Let the lugs of the frame rest on the middle fingers of each hand, these being bent toward the chest. Turn the comb end for end by swinging the left hand to the right of the right hand, then swing the comb up into the position shown in Fig. 10. To get to the original position, reverse the movements.

REPLACING FRAMES.

When through with this frame, replace it in the hive, pushing it tight against the vacant side. There is no excuse for placing it on the ground. If you have changed it so that you have forgotten which is the front end, just look at the brood, for the bees prefer to have their young toward the entrance of the hive, but the honey at the rear. When you have examined as many frames as you want, push them over to their original position by putting the hive-tool between the side of the hive and the end-bar of the frame, and using it as a lever. Now insert the frame first taken out, pushing it into place, then the follower.

Occasionally it is necessary to move a brood-chamber from the stand, and to the novice it is a problem what to do with it. He feels he should not set it on the ground, as there is every chance of killing many bees. The smaller the bearing surface the better, so one can use a bottom-board, an empty hive, or a very shallow box, resting the bottom of the hive across the sides.

Our first excursion through a bee-hive has been quite a long one, and has disturbed the

arrangements of the inmates, not only to a considerable extent, but possibly to the injury of the young; for in May it is a rather extensive incubator where many thousand eggs are being hatched while young bees are being brooded. An open hive means the loss of heat; therefore we resolve that in future we will do the necessary examinations as speedily as possible, and never lift the cover unless the shade temperature is about 65 or warmer.

Victoria, B. C.

THE BRAULA CÆCA NOT A TRUE PARASITE.

BY JOHN A. WOLFFSOHN.

I notice in your August 15th issue, page 468, an interesting paper on "*Braula cæca*," by Dr. Bruennich, in which the author says that "to my knowledge no one has observed the act [of feeding of the bee-louse] till now." It may interest the doctor and some

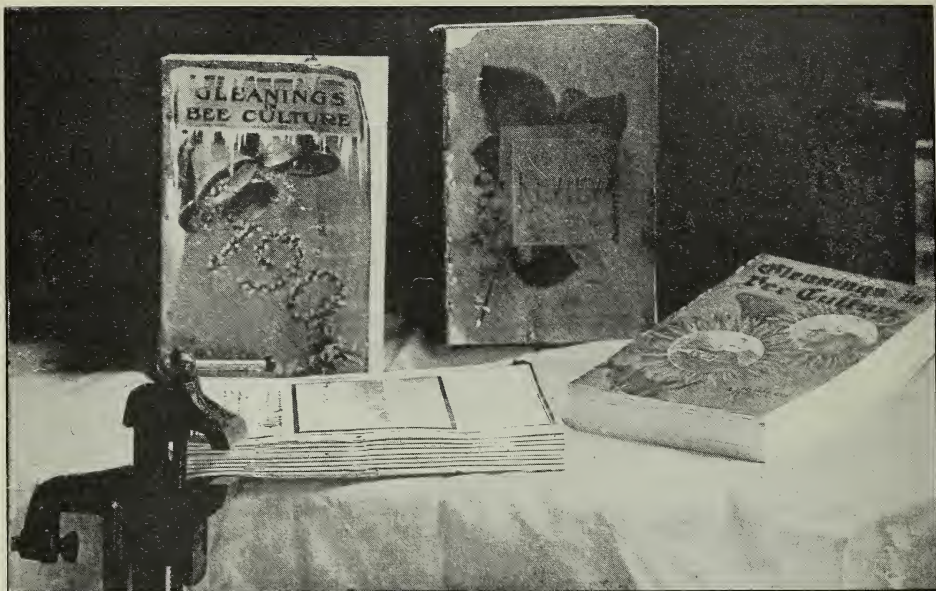


Aplary of T. H. Hill, Maywood, Ill., a suburb of Chicago, Ill. A neighbor's house is just back of the fence, but there have never been any complaints. The hives are at the back of the lot in full view of the street, and attract a great deal of attention, especially when the owner is working with the bees.

of your readers to learn that M. Lucien Ichès, in his excellent work, "*L'abeille domestique*," Paris, 1905, quotes the following from J. Pérez, *Notes d'apiculture*:

One day, having captured a bee with one of these lice I fixed its head with a pair of pincers sufficiently to keep it unmovable, and to capture the small parasite easily. Both it and the bee were left for a while on the table in my studio, under a glass.

When I returned to them I was not a little puzzled to see the parasite in the most vivacious and strange agitation. Seated on the fore part of the bee's head it was moving about with incredible vivacity, as though possessed of veritable rage. Now it would go to the margin of the bee's cap, with its fore feet raised, stamp and scratch as hard as its weakness would allow at the base of the bee's lip; then it would suddenly run back to the insertion of the antennæ to renew its impetuous attack immediately. I was quite taken up by my first surprise, when I suddenly saw all this fury turn to per-



"Nailing" together GLEANINGS for half a year.

fect calmness, and the little animal squatted on the edge of the cap and bent down its head to the bee's mouth, which was slightly trembling, and sucked up a drop of moisture.

I instantly understood. The movements I had just witnessed were preparatory to the animal's meals. When the louse wishes to feed it goes to the bee's mouth, where the motions of its feet, armed with bent claws, produce a tickling sensation, perhaps disagreeable to its host, but at least provoking some movement of the bucal organs, which slightly open and release a small drop of honey which the louse at once licks up.

Thus the *Brachycaea* is not a real parasite of the bee in the true sense of the word. It is rather a guest—queer, if you like thus to consider it, like so many others existing among animals.

Valparaiso, Chili.

BINDING COPIES OF GLEANINGS CHEAPLY.

BY C. A. KINSEY.

Take the copies of GLEANINGS from July 1 to Jan. 1, 12 in all. That is enough to be convenient. Place them in order in a clamp or vise and fasten firmly. Drive three shingle nails along the back on each side. It is not necessary that the nails go clear through if they are driven in from both sides. Then take them to a printing-office if convenient, and have them trimmed. Cover can be added if desired. This way will keep them firmly together, and with the yearly index at the back it will take only a few moments to find any article desired.

GASOLINE-CANS FOR HONEY.

Can you inform me if it is safe to use gasoline-cans to put extracted honey in—that is, if there will be any substance from the gasoline that can't be washed out that would taste in the honey?

I can get a considerable number of such cans, all new and in good condition, for nothing, that could be used to store my honey in, or for local trade.

Belgrade, Mont.

[We do not believe there would be any objection at all to gasoline-cans provided they are clean and free from rust. Kerosene-cans can seldom be cleaned so that all the odor of kerosene is removed, and the honey is then tainted; but if you can be sure that the cans you refer to have never been used for kerosene, but only for gasoline, we do not think there will be any difficulty at all. They would have to be rinsed out, of course; for after a can is emptied of gasoline there is some dirt and sediment that remain, usually; but this could be easily washed out.—ED.]

AN OKLAHOMA EXHIBIT.

Some Proof that Oklahoma is Advancing as a Honey State.

BY N. FRED GARDINER.

Photography has become a wonderful art. It can reproduce on a flat surface, in black and white, marvelous shades of beauty, and in many instances bring to our attention details that escape the eye in actual observation of the original object. But photography falls far short of doing justice to a honey exhibit. It seems that the eye of the camera can not penetrate the glass jar and show up the rich tint and the delicate structure of the honey and the comb.

Therefore we can judge of the relative merit of an exhibit only by comparison.

I did not realize how true this is till I saw the photograph which is reproduced with this article. This is undoubtedly a good photograph, comparatively, but it certainly fails to bring out the beauty of the exhibit. It is a picture of the exhibit of B. F. Bartholomew and wife, of Norman, Oklahoma, at the State Fair, Oklahoma City, 1911. This display covered a space of 10×30 feet, and was a fine example of the bee-keeper's art. There were two other exhibits that would compare favorably with those of other State fairs, but the one shown here took 14 out of 16 blue ribbons, and was, therefore, clearly in the lead.

Mr. Bartholomew made his plans as would an architect—measured his space, then built his special shelving at home and shipped it, together with the jars which he had ordered especially for each space, to the fair.

The designs in honey and wax were especially meritorious, the design in honey being built from foundation in the letters sawed in the boards, and mounted under glass. The designs in beeswax, were the horse-shoe and shield, and were of solid wax, and not dipped. This is another place where the camera fails to give results. The lettering on the shield and the wreath on both are not brought out. These were all hand carved from different shades of wax, and made a most pleasing effect. To the right can be seen just the corner of a fireplace built of solid wax brick, and holding a wax kettle, etc. Mrs. Bartholomew shared equally with her husband in arranging this display. The honey was mostly from alfalfa and sweet clover. This exhibit shows that Oklahoma is already prepared to compete with many of the older States.

Geary, Okla.

SOME PRACTICAL EXPERIENCE WITH A STEAM HONEY-KNIFE.

How it Assists in Extracting and Uncapping when the Honey is Cold.

BY B. M. CARAWAY.

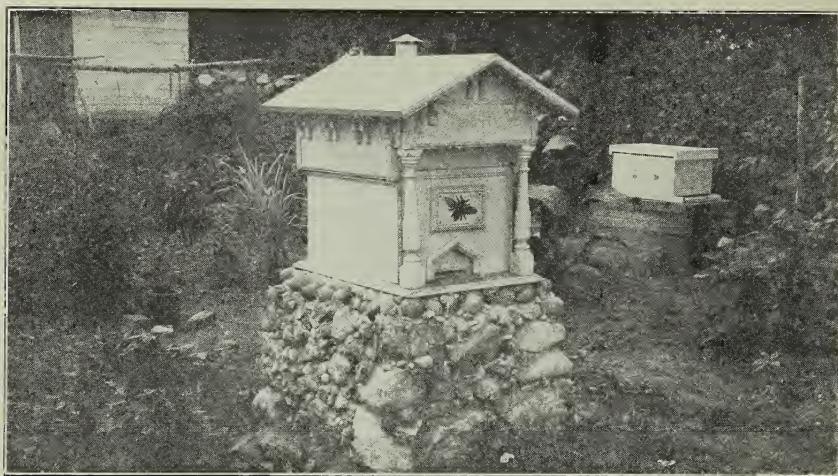
Some time ago the editor asked for reports, favorable or otherwise, concerning the steam honey-knife. There has already been a good deal said about this knife; but I don't feel that it has been given proper credit in spite of all that has been said. It is certainly a wonderful labor-saver.

One of the best features about this knife, and one that has not been mentioned, is that, when the honey is a little cold, the hot blade heats it up so that the extractor will throw it out of the cells easily. Quite often during the extracting season I take off honey one day and extract what I can; but there may be some left over until the next day. During the night it cools off until it is very thick. When I uncup it with the steam knife, however, it warms it up again until it extracts just as quickly as honey just removed from the hive that contains the original heat from the bees.

With the steam knife I can uncup faster than any one can using a cold knife. I have tried nearly all the knives on the market, including a butcher-knife, but none of them can be compared with the steam knife. There have been several large producers here, among them Mr. W. H. Laws, of Beeville, Texas, and all of them have been quite carried away with it. Mr. Laws is the owner of more bees than any other man in Texas, probably, and he said it was the best thing he had seen for a long time. If one uncups with the downward stroke, the weight of the knife will slice the cap-



Exhibit of B. F. Bartholomew at the Oklahoma State Fair.



Lewis' ornamental observatory hive.

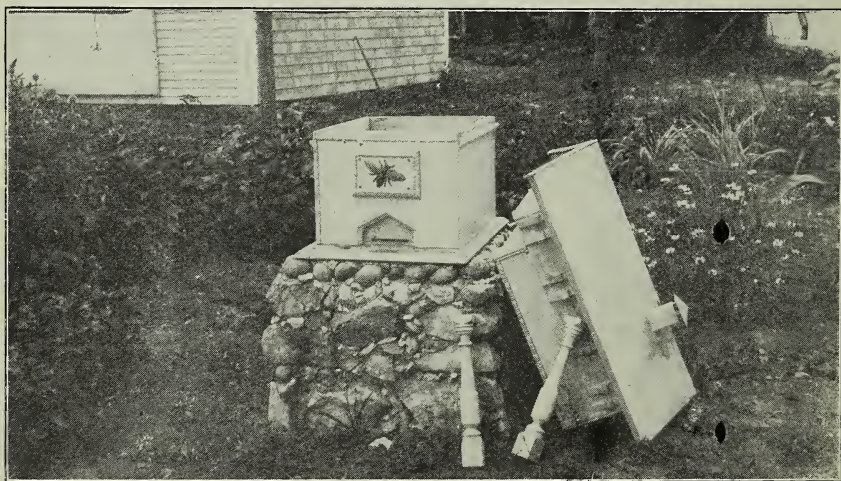
pings off one side. Of course, the knife alone will not go down as fast as though it were pushed a little, but still it does good work. In fact, while it will not do all my uncapping entirely by itself, it makes the work much more pleasant.

The worst trouble that I have had is that I have to wait a few minutes for the steam to be generated; but I find plenty to do in this time, as I have the cases to open and the tops of the pails to pry out, so that, before I get ready, the water is boiling hot and the knife ready for use. On page 272, May 1, Mr. O. B. Metcalfe says that he has trouble in generating steam enough, and he finds some kind of boiler having flues necessary. I have never had this difficulty; but it may be that the honey has a great deal to do with it. On one occasion I had

the stove turned up too high; and the can, in which I was generating the steam, burned. I use a one-burner gasoline-stove and a five-gallon can for the boiler, and I have never yet failed in having all the steam I wanted. I put in about a gallon and a half of water.

On page 451, August 1, Mr. Crane says that, while the steam knife works finely, it leaves a thin scum of wax over the cells; and when the honey comes from the extractor, this thin scum will go right through the strainer and then rise to the top of the honey in the can. I have never had any such trouble as this, although I have extracted several thousand pounds this year, all of which was uncapped with a steam knife.

The heat from the stove does not bother



The inside has the same dimensions as an ordinary ten-frame hive, and the sides are of glass.

me, for I have a fan run by a belt from a pulley on the engine. The fan was too much of a good thing at first, for it kept blowing out the blaze; but I remedied this by making a shield of a board in front of the stove, so that I have had no trouble since.

The great advantage of the steam knife is that one does not have to stop to scrape the cappings off the blade. The metal is so hot that they slide off as fast as they get on, and it is just here that the hot knife saves a great deal of time. Some have objected to the steam hose or tube, but I have never found it awkward in the least. In a very few minutes one becomes accustomed to it.

Mathis, Texas.

[There can be no question but that on some honeys the steam-knife is greatly superior to the cold knife or one dipped intermittently in hot water. The steam-knife keeps hot every minute of the time, and, as Mr. Caraway says, it warms the honey and makes it unnecessary for one to keep scraping it on something to remove the excess of cappings.—ED.]

BEE-KEEPING A RECREATIVE PURSUIT FOR A PROFESSIONAL MAN.

BY REV. J. M. LEWIS.

I wonder every suburbanite who has a garden does not have at least one colony of bees. They seem to me to be safe to keep, and perfectly harmless if treated with kindness and due consideration.

I have several colonies which are within ten feet of the house, and about thirty feet from the road where teams and automobiles are passing almost continually, and they have been there for more than five years, and have troubled no one.

I am sending some photographs of an ornamental hive which stands in the center of my flower-garden, the home of a fine colony of golden Italians. Scores of people—men, women, and children, have visited my garden this season, and not a person has received a sting. I have repeatedly opened the hive and removed the frames with the bees clustered on the combs to show my friends what can be done with bees.

I never use any protection in working among my bees, and but very little smoke; and sometimes I do not use the smoker at all.

The ornamental hive shown in the pictures is a fine advertisement, as it attracts the attention of people passing by. It is a double-wall hive. The inside is a standard ten-frame hive, and takes two supers. The brood-chamber has glass sides and back, and glass in the top cover, which I use when no supers are on. The foundation on which it stands is made of stones of different formations gathered from near and far, laid in Portland cement.

There are many ways in which an ornamental hive can be made, and yet be practical and an ornament, as well as a benefit to a flower or vegetable garden and to the

fruit-trees, of which almost every garden has at least a few, and will attract more attention than a rare plant or exquisite flower.

North Westport, Mass.

THE DISCOVERY OF THE SECRET OF FLOWERS.

A Brief Sketch of the Work of Sprengel and Mueller.

BY JOHN H. LOVELL.

The human race has long assumed (being the only organism at liberty to take itself at its own valuation) that it occupies a position of fictitious importance in the universe. It was a current maxim in the Middle Ages that man was the measure of all things. The world and its inhabitants, so ran this pleasant myth, was created a few thousand years ago solely to provide him with a congenial place of abode; and, because of his paramount importance, was placed in the center of the heavens. Not a little ingenious (and to-day amusing) speculation, was expended in an effort to explain how natural cataclisms and noxious animals and plants were disguised blessings; but that such was the fact, no doubt was permitted to exist. From these modest pretensions we have been receding for some centuries with much hesitation and reluctance. Perhaps the close of another hundred years will see them abandoned altogether, and humanity willing to admit that it is a part of nature, not outside and above her.

So long as these teachings prevailed it was very naturally a popular notion that the bright colors of flowers were of no importance except as they gave human pleasure. Much superfluous pity was wasted on those blossoms which, to use the words of the poet Gray, blushed unseen and wasted their sweetness on the desert air. Only a few years ago a similar sentiment was expressed by the editor of one of our popular magazines: "There was apparently no particular reason why the earth, at the time of Adam, should have been literally strewn with blossoms. They were of no particular use; there was only one man to see them."

This same idea is again repeated in Emerson's beautiful lines—

THE RHODORA.

In May, when sea-winds pierced our solitudes
I found the fresh rhodora in the woods.
Spreading its leafless blooms in a damp nook
To please the desert and the sluggish brook:
The purple petals, fallen in the pool,
Made the black waters with their beauty gay;
Here might the red-bird come his plumes to cool,
And court the flower that cheapens his array.
Rhodora! if the sages ask thee why
This charm is wasted on the marsh and sky,
Dear, tell them that, if eyes were made for seeing,
Then beauty is its own excuse for being.

It would seem never to have occurred to poet, editor, or philosopher that the beautiful hues of flowers might be useful to the plants producing them.

It was a German pastor, Christian Conrad Sprengel, at the close of the 18th century, who first pointed out the true signifi-

cance of conspicuous flowers. His book, now a botanical classic, attracted but little attention; his publisher did not even send him a copy of it, and in discouragement he did not publish the second volume, but turned from the study of plants to that of languages. The title of the work, "The Secret of Nature in the Form and Fertilization of Flowers Discovered," affords us the pleasure of knowing that he rightly estimated the importance of his observations. Sprengel clearly states, as is now well established, that the bright hues of flowers serve as signals to attract the attention of nectar-loving insects flying near by. He was led to this conclusion very fitly by the study of *Myosotis*, or the forget-me-not. He has not been forgotten. His name and theory were rescued from obscurity by Darwin; his book a few years ago was republished at Leipsic, and is now universally recognized, says Mueller, as having "struck out a new path in botanical science."

Sprengel was convinced that the wise Framer of nature had not produced a single hair without a definite purpose, and he examined a great many flowers for the purpose of learning the meaning of their forms and the arrangement of their parts. The salver-formed flower of the forget-me-not is sky-blue with a yellow eye. "While studying the flower of *myosotis* I was struck," he says, "by the yellow ring which surrounds the opening of the corolla tube, and which is beautifully conspicuous against the sky-blue color of the limb. Might not, I thought, this circumstance also have some reference to insects? Might not Nature have specially colored this ring, to the end that it might show insects the way to the nectar-reservoir?" "On further observation he found that the entrances to many other flowers were marked with spots, lines, and dots differently colored from the rest of the corolla. These markings he called "nectar-guides." "If the particular color of one part of a flower," he rightly inferred, "serves to enable an insect which has settled on the flower easily to find the right way to the nectar, then the general color of the corolla is serviceable in rendering the flowers provided with its conspicuous even from afar to the eyes of insects that hover around in the air in search of food."

Sprengel decided that flowers secrete nectar for the sake of attracting insects, and that it is protected by hairs or nectaries in order that they may enjoy it pure and unspoiled. At first he thought that the flowers receive no service in return; but he soon observed that the guests pollinated the flowers. He even noticed the frequent occurrence of cross-pollination, and remarks that "it seems that Nature is unwilling that any flower should be fertilized by its own pollen." He described the manner in which some 500 flowers were pollinated; but as he knew little about insects he did not pay much attention to the different kinds of visitors.

But while Sprengel had learned the secret

of flowers, and knew that their colors, odors, and forms were not useless characters, he failed to discover why cross-pollination is beneficial; and this omission, as Mueller has remarked, was for several generations fatal to his work. In 1841, Robert Brown, an eccentric English botanist of great learning, advised Darwin to read Sprengel's book. "It may be doubted," says Francis Darwin, "whether Robert Brown ever planted a more beautiful seed than putting such a book into such hands." Thus is the torch of learning, shining with ever increasing effulgence, handed on from one investigator to another. Darwin was already engaged in studying British orchids, of which he wrote to Bentham, "They are wonderful creatures, these orchids." His interest in the structure and pollination of these curious plants was greatly increased by reading what the old German pastor had done. Darwin soon discovered that frequent crosses increase both the vigor and productiveness of the stock, and that an occasional cross is indispensable. The principal agents which nature employs for this purpose are insects, birds, wind, and water. So impressed was Darwin with the importance of cross-fertilization that he closed his famous book on orchids, which marks the next great epoch in flower ecology, with the words, "Nature abhors perpetual self-fertilization." "The charm," says Mueller, "was now broken, and the value of Sprengel's work was at once recognized." "The merits of poor old Sprengel," says Darwin in his biography, "so long overlooked, are now fully recognized many years after his death."

In 1866, Darwin's *Origin of Species* and book on orchids was read by Hermann Mueller, a young teacher at Lippstadt, Germany, who thenceforth enthusiastically devoted the rest of his life to the study of the pollination of flowers. Many other investigators were also stimulated by these epoch-making books to study the charming problems of floral structure, as Delpino in Italy, Axel in Sweden, Hildebrand in Germany, Asa Gray in North America, and Fritz Mueller in South America. But they were all easily surpassed by Hermann Mueller, who is still regarded as the foremost of florocologists. In Thuringia and in the Alps he examined many hundreds of blossoms and observed the visits of insects by thousands. He was the first to collect and publish lists of flower-pollinators on an extensive scale, and the biology of flowers may thus be said in its broadest sense to have been established by him. Never since has this branch of botany been cultivated with equal success. His book, "The Fertilization of Flowers," ranks with the works of Sprengel and Darwin, and marks the third great epoch in the history of the ecology of flowers. It is illustrated by many excellent wood-cuts, the drawings for which were made by Mueller himself. It contains descriptions of the floral mechanisms of a great number of species of plants, with lists of

their insect visitors. It will give some idea of the immense amount of labor involved in its preparation to state that 5231 visits to flowers by 843 different kinds of flower-visiting insects are recorded.

Mueller had never forgotten his earlier delightful journeys among the Alps, nor its rich and brilliantly colored flora. For six summers he continued with great diligence to investigate its flowers, and the result was his second great work entitled "Alpenblumen," or the Flowers of the Alps. Here are enumerated 5711 visits by 841 species of anthophilous insects. It is impossible to read this account of the mysteries of the floral world in high altitudes without longing to visit the scene of his investigations. The short summers, the rapid (not to say impetuous) advance of vegetation, the simultaneous blooming of many species, the brilliant hues, the wealth of insects, and especially the great abundance of butterflies, against a background of snowy summits, form a most enticing picture. Mueller published a third book on flowers, besides many shorter papers.

To-day there are very few investigators engaged in studying the life histories of flowers. In North America they number less than half a dozen. Most observers are content to restrict their attention to the botanical side of the subject, and ignore the great company of pollinators. Even Charles Darwin and Anton Kerner, whose writings still remain an ever inspiring source of information, gave little heed to the ways of the insect guests. The reason for this is not far to seek. To collect and prepare lists of the visitors and to observe their behavior requires so enormous an amount of time, labor, and patience that the opportunity is possible to very few people. Suppose that a flower is in bloom for two weeks, then, on every calm bright day many hours must be devoted to this work, for the guests at the beginning of blooming-time may differ from those at its close. There follows the almost insuperable task, at least in America, of determining the names of the captured insects. With the exception of the butterflies we have no manuals of the different orders, and the literature is in a truly chaotic condition, many papers not being obtainable at any price. It is noteworthy that each of the three or four more prominent investigators of floröecology in America has been compelled to work up the classification of the bees in his locality—a rather formidable undertaking in itself. So closely allied are the species and genera that no one can distinguish them without a special knowledge of the group, which in its relations to flowers exceeds all others in importance.

But the value of an acquaintance with the insect visitors can not be easily overestimated; for some species fly only in the spring, others only in the fall; some species visit only one kind of flower, others many kinds; some are most welcome guests, others are mere robbers. I should never have dreamed that the pretty nodding pink

blossoms of the twin-flower, with its sweet vanilla-like fragrance, are in our northern woodlands attractive to gnats alone. One afternoon a large bed of these delicate flowers was carefully observed, and eight visitors were collected. On examination they were found to belong to a single species of fly (*Empis rufescens*). Further observations show that in this locality this fly is probably the only guest. A burly bumblebee flew over the flowers without paying any attention to them.

Among aquatic plants living in freshwater rivers is the bladderwort (*Utricularia vulgaris*). The whole plant is submerged; but at blooming-time a flower-stalk is thrust out of the water, which produces deeply two-lipped bright-yellow flowers. I surely expected to find it a favorite of bees. But after repeated observations I have collected on the flowers in Maine only the long-tongued syrphid fly *Helophilus conotomus*. There is no way in which we can so easily learn the defects of flowers as to watch the behavior of insects upon them. No human eye can discover them so quickly. In a word, if we would fully understand the bright-hued floral edifices which so freely adorn the outdoor world we must study the *modus operandi* of their architects and builders.

Waldoboro, Me.

A FEW RANDOM NOTES ON THE WAY BEES "MAKE" HONEY.

BY ARTHUR C. MILLER.

[Most of us think we know all about honey production; and that is true if we consider the processes that take place from the hive to the consumer; but as yet no one has ever gone into details telling what takes place from the blossom to the comb, and for the very good reason that most of us would not take the time to see what is done, even if we knew where and how to look. With a specially constructed observatory hive by which the bees are compelled to build the edge of the comb up against the glass, it is possible to see what has hitherto been denied the ordinary observer. If we are not mistaken, Mr. Miller is the pioneer in the use of this kind of glass hive. In the following article he tells a story that is exceedingly interesting to the student of nature—a story that we believe will be verified by any one else who will take the time to watch the bees work when in the hives.—ED.]

The bee returning from the field with a load of nectar does several things which are quite contrary to the rules we have laid down for her. She does not rush for a cell to put it in; on the contrary, she spends a seemingly needless amount of time wandering about and inspecting cells. When at last one is found that seems satisfactory she enters it, feet up and back down. If the cell is empty she puts her mouth into the upper and rearmost angle, opens her mouth and mandibles, and at once a drop of nectar is seen to well up until it touches the cell. Slowly the head is turned from side to side, spreading the nectar against the corner of the cell. All the time the mandibles are kept in motion as if biting, though the tips do not meet. The outflowing nectar fills

the mouth, flows up over the upper lip (labrum), and fills the space between the mandibles. When the bee has emptied her sac she backs out of the cell, wipes off her face, antennæ, and tongue, stretches and plumes herself, and, likely as not, crawls into some cell or hangs in some quiet corner for a nap. Thus she may stay for a few minutes or for half a day. Busy little bee!

If the load is to be deposited in a cell already containing more or less honey the procedure is the same, except that mandibles and mouth parts are submerged in the honey in the cell. No matter how far the honey may lie out on the floor of the cell, the bee never gets her face in it, but tips her head out until it looks as if it would part from the thorax. In all the depositing of honey or nectar the tongue is never used, but is kept folded behind the head.

So far as it has been possible to determine, the nectar-laden bee never yields any of it to the other bees. This statement applies to times of plenty; for when the colony is on the verge of starvation the home bees do sometimes obtain food directly from the returning worker. If they do it at one time they may at another; but certainly such is not the common way when honey is being freely gathered.

At night the ripening process, which during the day receives little attention, becomes the work of a very large part of the bees. Over all vertical surfaces the bees spread in single layers, and each bee appears to have plenty of elbow room. Every honey-treating bee hangs vertically with head up. The mandibles are spread, the mouth opens, and a drop of nectar appears, increasing in size until it fills the mouth, flows up over the upper lip (labrum), and fills the space between the mandibles. Then what, for convenience, we will here call the lower jaw (labium) begins to move with a chewing-like motion, and this causes the exposed drop of honey to "pulsate." Slowly and steadily this is done, the bee sometimes continuing it with one drop for ten, twelve, or even more minutes; then there is a pause, the drop is swallowed, and the bee rests for a few seconds; then another drop appears, and the process is repeated. The volume of the exposed drop is somewhat less than the capacity of the honey-sac—estimated at a quarter to a third less.

Each individual bee continues her work until seemingly the nectar is so changed that it ceases to excite the nerves. When this stage is reached she generally deposits her load in a cell and goes to sleep, although sometimes she may take another saful from some cell and resume her labors. Just what the age is of the bees doing this work has not yet been determined; but so many bees work at it that it seems as if bees of almost all ages take part.

When the bees have not room to store their loads after treating them they must needs keep them, and it is then that they secrete wax freely. The very process of "ripening" seems to cause the production of

much wax; but if the bees have to hold their loads the amount produced seems much greater. Perhaps it is not so much more as it seems.

That the ripening process is accompanied by wax production is easily proved by the following experiment: Feed a colony with thoroughly ripened honey diluted with about one-third its bulk of water. The bees will store and thicken this, but will not produce much wax—very little, in fact, unless they are getting some nectar at the same time. Feed another colony a syrup made of equal parts of granulated sugar and water, or, for more pronounced results, use more sugar. This colony will produce a lot of wax—so much, in fact, that if the experiment is continued for four or five days the new wax will be found stuck all over combs, frames, hive-sides, etc.

At the time the two colonies are being thus treated, two more should be allowed only what food they get from the fields, and these colonies used as "checks," i. e., colonies under normal conditions to compare the other two with.

The colony continues its ripening labors until about 11 P.M., sometimes a little later, occasionally as late as 1 A.M. The cause of the variation is unknown. All during this work the colony keeps up the deep hum, so well known and so welcome to bee-keepers. The cause of the humming is not determined. It does not seem as if the proportionately few bees fanning could cause it all.

An examination of the bees doing the ventilating is interesting, for the volume of air they drive from the entrance seems out of all proportion to the number of bees doing that work.

Most of such fanning is done at or near the entrance, and not by masses of bees all through the hive, as commonly supposed. There are occasions when fanning is done all through the hive, as when the heat is very great or when the hive is deluged with smoke; but these are not normal conditions.

The attention of students of the grand functions of the bees is called to the opportunity afforded for the secretions of the glands opening on the mandibles to mix with the nectar.

Providence, R. I.

[The statement has been repeatedly made that the ordinary bees on returning from the field, laden with nectar, do not deposit their loads directly in the cells, but pass them along to young bees in the hive, not old enough to go to the field; that these latter, in turn, deposit nectar in the cells, and then return to unload other worker bees that have come from the field.

Busy as a bee! It is popularly supposed that the bee works incessantly if we except the hanging-out in front on a very warm day when the entrance is contracted too much. This is a very interesting field for study and observation. If any of our readers have a story to tell different from that presented by Mr. Miller, we hope they will tell us what they have really seen.—ED.]

Beginners' Questions.

In presenting this list of questions it should be understood that it is impossible, in many instances to do justice to the subjects in the short space here allowed, and for full particulars we refer the reader to our encyclopedia on bees—the A B C and X Y Z of Bee Culture—a book that is of inestimable value to the beginner and expert as well.

Q. Where can bees be kept?

A. There are few places in the country where one or more colonies of bees can not make honey. It is true that the natural surroundings may be unfavorable to the bees, but one who has had no experience is often astonished as to distance bees will go in search of nectar of the flowers. In almost every large city there are some bee-keepers who have bees right in the heart of the city, either in back lots or on the roof of buildings. Ordinarily, bees will go from one to three miles in search of nectar, but if there is none nearer they will go much further. There are cases on record of bees going seven miles from home.

Q. Do bees ever make trouble in a city?

A. It is very seldom that bees make trouble of any sort in a town or city, and if the bee-keeper is careful, there need be none at all. We advise placing the hives in the back yard as far away as possible from the general highway.

It is true that in some few cases city councils have attempted to pass ordinances declaring bees to be a nuisance; but no such ordinance is constitutional, as the supreme court of Missouri in what is known as the Arkadelphia case, has decided that bees are not a nuisance per se. A similar case was tried in Rochester with the result that a verdict was rendered in favor of the bees. Full particulars concerning these can be obtained by addressing General Manager N. E. France, of the National Bee-keepers' Association, Platteville, Wis.

Q. What must be planted for bees to work on?

A. Strange as it may seem, it usually does not pay to plant anything that is valuable only for the honey unless waste places such as roadsides or fence corners can be utilized that would be of no value in any other way. Very often the natural sources of nectar in a locality can be augmented by the sowing of sweet clover seed, and since this is becoming to be known as a valuable forage instead of a pest or weed, as it was formerly called, there is no question but that it pays to grow sweet clover for hay and thus secure some additional honey of fine quality, also. However, it must be remembered that each blossom yields only a small amount of nectar, hence there must be hundreds of acres of any such plant before any great difference will be noticed in the surplus honey produced, if there are very many bees in the locality. However, as stated first, almost every locality has enough natural sources of nectar to support one or more colonies without artificial pasturage.

Since alfalfa clover and alsike clover are being grown more and more even by the farmers of the East, there is every reason to suppose that there will be more honey produced from these sources in the future than ever before. Buckwheat is a good yielder and especially valuable for furnishing nectar in the late summer to keep up brood rearing.

Q. Do bees do well in a fruit country?

A. The fruit trees alone, unless there are acres and acres of them, do not usually furnish enough honey to be noticeable in the surplus supply secured, but of course there are many exceptions to this in localities where fruit is grown extensively. In this connection, however, it might be well to state that bees are a necessity in a fruit growing locality, for without their aid the blossoms do not set, that is the cross fertilization is not accomplished. It is true that the

wind and other insects distribute the pollen to a certain extent and thus fertilize the blossoms, but at the same time, if there are no bees at all a great many of the blossoms will not bear fruit. A simple experiment may be tried to prove this: Cover a branch of blossoms with coarse mosquito netting which will just prevent the bees from getting through, and it will be found that the blossoms on this branch will not bear fruit, even though the netting is removed as soon as the petals fall.

Q. Do bees work on ripe fruit and spoil it?

A. If the skin of the fruit has been punctured by some other insect or by the birds, it is true that the bees will work on the pulp and juice of the fruit thus exposed, but such fruit would be unfit for market anyway, hence the bees after all do no real harm. Bees by themselves can not possibly puncture the skin of fruit. Sound fruit, if kept carefully guarded from birds and other insects, will be untouched by the bees. This has been demonstrated over and over again.

Q. How many kinds of bees are there in a colony?

A. During the early part of the summer a normal colony consists of one queen, the only perfect female in the hive; several hundred drones (the male bees)—and any where from twenty to fifty thousand worker bees, which are undeveloped females. The queen is not the ruler of the hive as was formerly supposed, but is simply the mother; she lays the eggs. A good prolific queen in the height of the season will lay from two to four thousand eggs per day, or nearly twice her own weight, in twenty-four hours. Continual feeding by the worker bees enables her to do this. The drone is the male bee and he has no sting nor any suitable tongue with which to work; hence the drone does no work, not so much because he is lazy but because he has no tools to work with nor weapons with which to defend the hive. The workers are stunted females, and as their name indicates, they do all the field work such as bringing in pollen, nectar, building the comb and feeding the young.

Q. How many colonies can one man take care of?

A. This depends on the man and so this question can not be definitely answered any more than one could positively say how many acres of land one man could farm. However, one man with a little help in the busiest part of the season can usually care for as many as five hundred colonies if he is experienced. Colonies of bees in order to produce good results, must be properly taken care of. A hundred weak colonies not in good condition for producing honey by the time the main honey-flow opens, will not produce as much surplus as ten colonies that are very strong and in the very best condition at the time the main honey-flow begins.

Q. What profit can reasonably be expected?

A. As much as \$10.00 per colony has been secured where there are only a few colonies to the locality, but this is above the average. \$2.00 to \$3.00 a colony would be about the figure where there are a large number of colonies.

Q. How much increase can be expected in a year?

A. If natural swarming is allowed a fifty percent increase is perhaps an average. No colony should be allowed to swarm more than once, for the parent colony is too greatly re-

duced in strength if more than one normal swarm issues. Professional bee-keepers usually make their increase artificially, however, and it is not at all a difficult matter to double the number of colonies in a year. In fact, an expert, when all conditions are favorable, can increase a three-frame nucleus which is only about one-third the size of an ordinary colony into ten full size colonies by fall, but of course this is beyond the reach of the average amateur. The whole question of increase is fully explained in the A B C & X Y Z of Bee Culture.

Q. Will beating tin pans, ringing bells, etc., stop swarms?

A. No. Almost every swarm immediately after it issues will soon cluster anyway at some convenient point until the bees get their bearings. How the custom of beating tin pans, etc., started no one knows. If a swarm is inclined to make for the woods at once, the bees can be made to cluster very quickly if a good spray pump is at hand for a good drenching so wets their wings that they are forced to cluster until they can dry off.

Q. Is it possible to remove bees from hollow trees or the walls of a building?

A. Yes, this may be done without trouble but the easiest way is to cut down the tree or remove some of the siding of the building, as the case may be, but if this is impractical a device known as the bee-escape may be placed over the opening or entrance which will allow the bees to pass out but will prevent them from going back in again. If a hive containing comb is arranged close to the opening on the outside all the bees may be secured in this way, or practically all of them except the queen and brood. A new queen will have to be on hand and introduced to the bees. Most of the modern books on bees describe the various processes of transferring bees from trees or buildings into hives, so that one who is desirous to start in this way need have no particular difficulty.

Q. What strain of bees is the best?

A. There are not as many different varieties of bees as of poultry, for instance, owing to the fact that since the mating of the queens and drones takes place in the air, the male parentage can not be controlled, hence if a number of different varieties of bees were kept in the same yard they would soon be hopelessly mixed up and a mongrel bee be the result. The Italian bees are preferred by the majority of bee-keepers in this country, although the Carniolan and Caucasian bees are beginning to be used somewhat where early brood rearing is desired.

Q. Can one who takes care of bees keep from being stung?

A. Yes, if necessary, one can so protect himself with a good veil, gloves, etc., that there is practically no danger of receiving a sting; but practical bee-keepers after they have been stung a very few times are not bothered very much in this way, for the stings lose their effect, that is the system becomes immune to the poison so that no swelling takes place.

Q. Is there any danger of bees stinging neighbors or their cattle?

A. There is some danger, but at the same time very little. Occasionally, sweaty cattle or horses if allowed to get in the direct line of flight of the bees, will irritate them so that they may be stung, but after all, such instances are not the usual thing. If proper precautions are taken, neighbors need not be annoyed in any way. If robbing is allowed bees are always more irritable.

Q. How may I know when bees are robbing?

A. When bees are working in the field there will be a quiet, contended hum that is very different from the excited high-key note that one hears when bees are robbing. At such times they are almost sure to be cross, and when it is allowed to continue they may

sting not only human beings but domestic animals. A careful examination of the apiary and surroundings may show that the bees are either robbing some hive or hives, or have got into the honey-house or kitchen, and are helping themselves to sweets. In the case of the building, the doors should be closed immediately. Toward night, they can be opened allowing the robbers to go back home. But doors should be kept carefully closed the next day and thereafter because the robbers will come back.

If the bees are robbing some colony or colonies there will be found more or less fighting at the entrances. Some bees will be stung to death; and after the colony is overpowered, robbers will rush in and out at a terrific rate. There will be a general uproar in the apiary; and if these conditions continue, other colonies that perhaps are not as strong as they should be, will be robbed and possibly overpowered. The remedy is, to carry the robbed colony or colonies down cellar immediately, where they should be kept two or three days. When set back on stand, the entrance should be contracted down to a space so that only one or two bees can pass at a time. For full particulars on this subject, see "Robbing," in the ABC & XYZ of Bee Culture.

Q. How can I distinguish the play-spell of bees from robbing?

A. On bright days, especially those days following inclement weather, after bees have been shut up for some time, one will often find an unusual commotion in front of some particular hive. Bees will be flying thickly before the entrance in such a way that a beginner might suppose it to be a case of robbing; but there will be no fighting, no bees struggling against each other, no dead bees, but, on the other hand, bees will be flying around aimlessly in front of the entrance, a few going in and some out. When there is robbing going on, there is a life-and-death struggle; and after the colony is overpowered the robbers will be rushing into and out of the hive at a furious pace. For further particulars, see answer to preceding question.

Q. What kind of hive is the best?

A. This question can not be answered definitely. Complicated patent hives are usually very little if any better than the cheap wooden boxes that they are sold at a high price to take the place of. The standard ten-frame hive is preferred by the majority of honey producers, but if comb honey is to be produced the upper part of the hive should be of a different style than if the bees are to run for extracted honey. Beginners in the North will succeed best with the ten-frame double-walled packed hive that is warm in winter and cool in summer.

Q. What are the different parts of a bee hive?

A. A regular beehive consists of a floor or bottom board; a brood chamber which contains the ten frames that surround the combs; the super that holds the square sections for the surplus honey, and the cover. The brood chamber is a plain box usually with notched or dovetailed corners to give added strength, and with the end of the box rabbeted at the top to hold the projections of the top bars of the frames that surround the combs. The bees are induced to build the combs in these frames by means of a sheet of what is known as comb foundations that is suspended in the middle of each frame, which acts as a pattern to enable the bees to build their combs straight. If this were not used they might build the comb crosswise of the frame or in bunches or in clusters, so that it would be impossible to separate one comb from another for purposes of inspection. The super or upper part of the hive gets its name from the fact that it holds the superabundance of honey. The modern bee-keeper does not rob his bees; that is, he does not take from them honey that they require for their own food, but simply removes the surplus of which there

is often ten times as much as they could possibly use themselves.

Q. How can I tell a queen cell from all the rest?

A. It is much larger than the rest of the cells and stands alone by itself. It somewhat resembles a long-pointed peanut, and it is built on the surface of the comb with the small end downward. Usually, queens cells are found on the lower part of the comb.

Sometimes old queen cells are left over from the year before and these should not be confused with fresh cells. The old ones do not have a finished look and are generally dark colored and very shallow, scarcely noticeable from the rest of the comb, except in size.

Q. What is the best way to introduce a valuable queen?

A. Select a couple of frames of hatching brood and place them in an upper story on top of a queenless colony with wire cloth between the two stories. After a number of young bees have hatched, release the queen among them. In about a week's time or after most of the bees have hatched, set the two frames of bees and queen down into the lower story and all will go well providing that any queen cells in the lower story are destroyed.

Usually there will be directions to go with these queens when sent out by mail. Of the cage plans for introducing, the push-in-comb-cage plan we consider the most reliable. For particulars regarding these, see "Queen-cages," on another page.

Q. What is pollen?

A. The ordinary diet of young bees is the food or pap made of a mixture of honey and pollen. Pollen is gathered from the flowers, and carried to the hive in large pellets packed on the bees' legs. Unless bees have sufficient pollen in the hives, brood-rearing can not be carried on, for pollen furnishes the nitrogenous element that is required.

Q. Some of the cells in my combs are half filled with a semi-hard, granular substance. What is it?

A. Bee-bread; that is, pollen packed hard in the cells for future use. Sometimes, this becomes old and stale so that the bees do not use it.

Q. What is propolis?

A. Propolis is a resinous red to brown substance that is sticky in warm weather, and brittle in cold weather. The bees use it for closing up gaps or openings, especially those openings that would let in cold air. They gather propolis from gums found on trees, and from buds. It has no commercial value.

Q. How can I remove propolis from my fingers?

A. A few drops of kerosene or gasoline will soften it so it can be easily removed by the use of soap.

Q. Do bees have diseases?

A. There are a few diseases of the adult bees such as dysentery, bee paralysis (not like paralysis of the human body); but the most serious diseases are those of the brood such as American or European foul brood. These, however, may be easily cured unless the bee-keeper is so negligent as to allow his whole yard to become diseased before he does anything about it. See A B C & X Y Z of Bee Culture.

Q. What causes the bees to carry their brood out of the entrances of the hives?

A. There may be several causes. First, the moth-miller, or moth-worms, rather, that have built their galleries through the sealed brood, destroying the young brood. These the bees will carry out and deposit in front of the entrance.

The most probable cause is chilled or overheated brood. Sometimes the combs, when handled by inexperienced bee-keepers, are ex-

posed for some little time to chilling winds. Such brood will die as the result of exposure, and will be carried out in front of the hive. Sometimes the entrances of the hives are too small in extremely warm weather. The bees are unable to ventilate properly, and the hives become overheated, thus killing the brood. The result is, it is carried out and left in front of the entrance. The third cause is poison gathered from fruit-trees by bees during spraying time. The brood dies, and is carried out as before.

Q. I have noticed a fine powdery substance on the bottom board. Does this indicate that something is wrong?

A. No, this is merely bits of cappings gnawed off by the bees or bits of comb, wax, or propolis. There is no occasion for alarm when this is found.

Q. What is the best way to get rid of moths?

A. Do not listen to any one who wants to sell you a patent moth trap or moth-proof hive. Strong colonies of vigorous Italian bees protect themselves against moths and moth larva, so that this trouble is practically unheard of in an Italian yard. Of course, if colonies are allowed to get weak and to degenerate moths may affect an entrance and make trouble, but not otherwise.

Q. What is a bee smoker?

A. A device for blowing smoke on the bees—not to stupefy them but to cause them to fill up with honey so that they are better natured and thus more easily handled.

Q. What is the best fuel for smokers?

A. Unquestionably greasy waste is best, such as can be obtained at any ordinary machine-shop, for the asking. Rotten wood, planer shavings, old rags, etc., do very well.

Q. What is the difference between "comb" and "extracted" honey?

A. Comb honey is produced by the bees in small, square boxes and sold in this way just as the bees left it. The extracted honey is the liquid honey thrown out of large combs filled by the bees, in a centrifugal honey extractor which works somewhat on the principle of a cream separator. That is, the liquid honey is thrown out of the cells leaving the comb as good as ever and it is put back in the hives and filled again by the bees. For this reason the extracted honey is cheaper as the bees do not need to build new comb each time.

Q. Which is the more profitable to produce, comb or extracted honey?

A. This depends largely upon circumstances. One who has but a few colonies had better produce comb honey, for the equipment required for extracted honey production is quite expensive and the outfit would usually not be warranted for a very few colonies. Professional bee-keepers, the majority of them at least, produce extracted honey largely. Nearly twice as much of the latter can be produced as of comb honey, but at the same time it brings only about half as much in the market as comb honey.

Q. Can comb honey be manufactured by machinery so as not to be told from genuine?

A. No, this is impossible. Comb honey has never been made by machinery and never will be, in spite of many newspaper statements and magazine articles to the contrary. The A. I. ROOT COMPANY, in order to show clearly that there is no such thing as manufactured comb honey, has, for nearly thirty years had a standing offer of \$1,000.00 for a single section of comb honey made by machinery that so nearly resembled the natural product as to deceive the average person. The fact that no one has ever been able to claim this money, shows conclusively that there is no such article on the market. There are plenty of reasons why such a feat would be impossible, but lack of space forbids the mention of them here. See A B C & X Y Z of Bee Culture.

Q. When extracted honey granulates is that an indication that it was adulterated with sugar?

A. No, for almost every kind of pure honey will granulate or crystallize in time. Some kinds of honey produced in the South will crystallize in only two or three days' time, but usually from two to six months is required. The honey may be returned to the liquid state by heating it gently in hot water. For the very best results the water surrounding the dish of honey should be no hotter than 140 degrees. A temperature much higher than this will give the honey a burnt flavor.

Q. I have some combs that contain granulated honey that I cannot extract. What shall I do with them?

A. Soak them in warm water and place in a super above a strong colony. The bees will usually clean out the cells although the combs may have to be wet two or three times before the work is finished.

Q. What is the reason my bees will not go into the supers and store honey?

A. Several causes might be assigned. First, no honey coming in, or at most a very light honey-flow; second, a colony too weak. There must be a large force of bees to store enough honey to fill the brood-nest to keep up brood-rearing, and yet leave a surplus to be stored in the sections or extracting-combs above. Third, sometimes a strong colony in a good honey-flow will not enter the super. In that case, if other bees are storing, an examination of the brood-nest may show that the brood-frames in the colony that sulks are "honey-bound"—that is, honey has been stored in brood frames until the queen has been compelled to stop laying. To remedy this, uncap all the combs and put on some sections from some other colony, which the bees have already partly drawn out and filled. This will usually have the desired effect.

Q. How can finished honey be removed from the hive?

A. The old way was to set the hive over a hole in the ground in which there was some burning sulphur, and after the bees were all killed to take the honey out with a spade. The modern bee-keeper as mentioned above, does not remove the honey the bees need but simply takes the surplus. A board containing what is called a bee escape, is placed between the super and brood chamber and the bees go down through into the lower part where the brood is and cannot get up again. In a few hours they are all out of the super and the surplus honey can then be removed without the knowledge of the bees. There is then no uproar, no stings, no confusion and no trouble of any kind.

Q. What is done with bees during winter?

A. If the colonies are not already in double walled hives the space between being filled with shavings or leaves, a winter case may be put over the regular hive and packing material put in after which a water proof cover is put over the whole thing; or the colonies may be wintered in a cellar which is kept reasonably dark and even in temperature. Except in the northern part of the northern states, however, it is usually safer to winter on the summer stands in double-walled hives or other hives especially packed for the cold weather. For further particulars, see A B C & X Y Z of Bee Culture.

Q. What is a winter nest?

A. It is a space of empty cells in the central combs three or four inches below the top bars. Bees if left to themselves will form this clustering space in the empty cells so that they can get closer together for warmth. If this winter nest is disturbed in the rearrangement of combs, it must be put back.

Q. How do we determine when a colony is strong enough to go through the winter?

A. The answer to this question depends on

the latitude or climate, the kind of hive and whether the bees are to be wintered outdoors. In a warm climate fewer bees will be required than in a cold, but more stores will be needed. In a cold climate for outdoor wintering we figure on not less than 7 frames covered with bees. For cellar wintering 4 or 5 frames will answer but more will be better. In the extreme south two or three frames of bees may be enough providing pollen and honey can be gathered in late winter. In all cases, it is better to have a hive full of bees; but in that case there should be 5 or 6 frames of stores or the equivalent in 8 or 10 frames.

Q. How can I stimulate brood rearing in the fall when queens ordinarily stop laying?

A. Queens two or three months old will lay when queens one or two years old will not. We usually advise having young queens in the fall, not only because they stand the winter better, but because they supply the hives with a force of young bees, so necessary for successful wintering. But old queens can be made to lay to some extent by feeding outdoors a sweetened water consisting of 15 parts of water to one of granulated sugar. This mixture should be thoroughly stirred, and then put into Simplicity or Alexander feeders, about fifty yards from apiary. The feeders will need to be filled two or three times a day, depending on the number of bees in the yard; but do not give them more than they can take up in a day, for in warm weather it will sour.

Q. What is the best way to unite bees in the fall?

A. If there are two colonies neither of which have strength enough to go into winter quarters, the weaker should be united with the stronger. Ordinarily, the old bees of the moved colony will go back to the old stand. To provide against this, proceed as follows: In the cool of the morning, or better, the last thing at night, smoke the bees thoroughly that are to be removed. Pound on the hive considerably, so that they will be demoralized. Carry the hive and set it down beside the other and shake the moved bees in front of the entrance of the other hive. If they are pure Italians, no smoke will be required. If they are dark hybrids or blacks, it may be necessary to examine the bees in fifteen or twenty minutes to see if they are fighting. In this case, smoke the hive thoroughly and shut it up. After they are nicely united rearrange the combs to form a winter nest.

Q. In uniting, what should be done with the queen?

A. Where there is no choice especially if neither queen is valuable, the two lots of bees can be united, and, as a rule, one of the queens will be left and the other destroyed. But where there is a choice, which is usually the case, the better one should be caged and introduced, and the other destroyed or put into some other colony.

Q. What is meant by balling a queen?

A. When bees are hostile toward a queen, they will cluster about her very thickly, sometimes forming a ball of bees anywhere from one to three inches in diameter. Every bee in the ball seems to be struggling to get at her to sting her. Unless she is released she will either be smothered to death or stung. To release her, use plenty of smoke, blowing it on the ball, until the mad bees disperse and then pick her up and cage her. Another way is to dip the ball in a pail of water, when the bees will immediately float away from her.

Q. If colonies die through the winter may new swarms the next season be put in the same hives?

A. If the bees did not die because of the result of disease, but simply starved or chilled, there is no harm in putting new swarms in these same hives. By careful attention, however, the winter loss may be reduced to a very small percent.

Our Homes

A. I. Root.

I was a stranger, and ye took me not in.—MATT. 25:43.

Be not forgetful to entertain strangers, for thereby some have entertained angels unawares.—HEB. 13:2.

And if ye salute your brethren only, what do ye more than others? Do not even the publicans so?—MATT. 5:47.

Come, ye, blessed of my Father, inherit the kingdom prepared for you from the foundation of the world; for I was an hungered, and ye gave me meat: I was thirsty, and ye gave me drink; I was a stranger, and ye took me in.—MATT. 25:42, 43.

Mrs. Root has quite a fondness for reading *old* books—those, for instance, that she and I read together when we were first married, and she persists in reading them again, even when I tell her there are new books just as good, or even better; and therefore when we started on our two-days' trip to our Florida home she laid out to read on the way an old book entitled "Knight of the Nineteenth Century," by E. P. Roe, as she has always had an especial fondness for all of Roe's books. Well, one day when I began to get a little tired of looking at the landscape I happened to glance at the open book I had read perhaps 50 years ago. At that date I was not a professing Christian; and although I found the book entertaining I fear I did not get hold at all of the great point the author had in view when he tried to show forth what is *real* Christianity, or, if you choose, what the real Christlike spirit *means*. The leading character is a young man who, through faulty bringing up, "went to the bad." He tried to turn over a new leaf and atone for his errors, but everybody seemed to make sport of his efforts to retrieve, and he became discouraged and went down again, lower and lower, until even his own mother lost faith in him; and when he was truly converted, *she* seemed to be more skeptical than any one else. When he tried to follow the teachings of his Savior, his rebuffs and discouragements from a cold and unfeeling outside world were almost unbelievable, did we not all see this same thing still going on almost everywhere. I was particularly impressed with his reception at one of the fashionable churches, where a kind friend had induced him to attend. I shall have to confess I have for some time been feeling troubled about the final outcome of so much money and *fashion* that is becoming so great a part of our town and city churches. In my previous Home paper I mentioned a pastor so eloquent and gifted that he was offered and accepted a much larger salary, while he was at the same time *guilty of murder*. What shall become of us if we continue to permit "grafters" and hypocrites to get in among the clergy?

After finishing the book, I told Mrs. Root I wished every member of GLEANINGS could read this old book, by one of God's faithful and devoted servants (she got it by mail of Sears, Roebuck & Co., for 33 cts.). Well, while having this whole matter in mind

you can imagine with what interest I read the following letter:

Mr. A. I. Root:—I have just this hour received your journal; and since your department, Mr. Root, is the very first and often the only thing I am reading in GLEANINGS I notice the letter that Mr. Klabuhn, of Conneaut, O., has written you, and your reply to it. (See page 707, Nov. 15.) I am a German myself, and this is only the sixth year I have been in this country. In other words, I am another "stranger" to you Americans.

Now, before I proceed any further let me thank you for the generous spirit with which you answer my landsman's letter. I pay you my highest respect for your nobility of mind, since Mr. Klabuhn must inevitably, although without intention, have slightly offended you. The reason for Mr. Klabuhn's opinion is, no doubt, his experience.

I simply love to read all your talks; but I must confess that I have never been to church in this country—not because I don't believe in God and his church, but simply because I have not yet found a human being here in America who would practice a true neighborly or Christian spirit. All with whom I come in contact have shown me, beyond the shadow of a doubt, that they can spare me some of their time only if there is some *advantage* in it for them—even ministers, every one of the few with whom I come in touch.

When I landed, six years ago, I could not speak English, and I began right away to study the language. After a while I became a member of the Y. M. C. A. of Providence, R. I. There I was, sitting all alone, and none of your young men of that organization spoke a social word to me, and my heart was yearning for social intercourse. Mind, Mr. Root, they did not yet know my way of thinking. They simply left me alone, and literally discouraged me from getting acquainted with them. I think they felt too important to associate with a foreigner.

A little later, again, I went to Boston to find work in that city; and there, being a member, I frequented the Boston Y. M. C. A.'s reading and other rooms, and there I met with the same fate. Only one lady clerk and one gentleman clerk of that institution proved an exception, inasmuch as they were really friendly to me, and gave me information quite cheerfully. You know both the lady and the gentleman were studying German, and tried to get me talking German with them, which I, by the way, was glad to do.

The Boston Y. M. C. A. maintains a house orchestra which practices on certain evenings, and plays Sunday afternoons for about an hour for the benefit of the other members. Now, since I am a violin player I offered to join this orchestra. Well, of course they let me play with them; but do you think, Mr. Root, they would let me get acquainted with them in a personal way? Not much! I felt exactly as if I were coming, playing, and going without being noticed at all. And they were, all of them, highly respectable members of that excellent organization. How I felt, you may or may not imagine. But all those and other experiences shattered my confidence in humanity and my belief in the sincerity of the men who pretend to be Christians. I do not wish to flatter you, Mr. Root; but I think you are one of the very few exceptions which do exist, because your work proves it to some extent. I firmly believe in our Lord, but I do not visit the church, and I often feel that I am wrong in not going to church.

Now, I wrote you all of this to show how one may be educated up to the point where Mr. Klabuhn seems to be. He says in his letter, "I am an *old* German." Now I am a *young* man—31 years of age; let me live another 20 years, and if, during that time, I meet with the same conduct of men, I shall, perhaps, suffer morally for it. Or will those suffer who made the misanthropist of me?

As it is, I am still wavering, and can not for the time of me decide regarding this vital question—I. e., whether I should visit the church and pretend to believe that my fellow-men are Christians, when, right down in my heart, I *know* they are *not*.

Plymouth, Mass., Nov. 22. BERNHARD KUNZ.

Dear friends, *you* especially who love the

Lord Jesus Christ, I hope you will read the above plaintive letter again and again, and then I hope you will go out "into the byways and hedges" and see if there are not some near you that you have overlooked, as our good friend describes. You who belong to the Y. M. C. A., look around and see if these things are true in *your* locality. Remember who it was that said, "Inasmuch as ye have done it unto the least of one of these my brethren, ye have done it unto me."

Now I want to suggest gently to our good brother who writes the letter that possibly there is at least just a little tendency to uncharitableness on his part. Are you not, my good friend, a little too modest and oversensitive? Are you sure you are doing your part? and is it not possible you are a trifle hard to get acquainted with? I want to quote right here something from the *Sunday School Times* that has done me a lot of good:

THE DEFEAT OF INJUSTICE.

No one can ever afford to think about any injustice he receives. It is disaster and destruction to do so. It is like deliberately lifting a glass of poison to our lips and swallowing it. Injustice inflicted upon us never harms us until we dwell on it. While we ignore it, and do right, it is powerless against us. When we begin to turn it over in our mind, it starts its murderous work upon us. It soon exaggerates itself, blinds us, rankles, inflames, embitters. It breeds self-pity, which quickly reduces us to a condition of worse than helpless uselessness. Jesus paid no attention to the awful injustices of his lot. We can not afford to do other than he did, with our lesser injustices. If love is our master-passion, thinking no evil and bearing all things, we shall live emancipated from the misery of dressing our own wounds. Such wounds heal quickly when we are lovingly busied with the needs of others.

The above sounds a little extreme, I admit; but I am sure it is God's message, nevertheless. In troubles of this kind we need to exhort strongly the parties on *both* sides to wake up and be ready to go a little more than half way. The editorial above* does not very clearly define the difference between personal wrong and a wrong against community; but the distinction is implied. I know what it is to dwell on some indignity or abuse until I am kept awake nights; and I know it is true that, if dwelt on, such things grow and enlarge, and finally spoil one's peace of mind. My father for several years was unhappy because a line fence encroached on his land. The surveyors told him the fence *was* over on his territory without question, but advised, as it had been there so many years, to let it rest to save quarrels and possibly a lawsuit with a neighbor; but because the surveyor who gave this advice belonged to our church, father had his own name taken from the church-roll, and could talk about and think about nothing else. Mother and the older children, the pastor of the church, and the deacons plead with him; but he persisted, and quoted, "right is right, and wrongs no

man," until one Sunday I persuaded him to go with me to a mission Sunday-school I was conducting in one of the worst points in our neighborhood. A lot of nicely dressed little girls and boys recited texts from the platform, and the zeal and enthusiasm of the whole school were truly inspiring. On the way home I asked him if such a work was not far more important than the value of a little strip of land of less than an acre. He assented, and gave me his promise to drop for ever the line-fence quarrel, and kept his word, went back to his church, and died at peace with God and with all his fellow-men.

HOW TO SUCCEED IN JOURNALISM, ETC.

I wonder how many of the editors of the fifty or sixty poultry-journals that come to our office by way of exchange read *my* writings. Well, I hope they will read *this*, even if they do not read what I say about poultry. While there are many good things to be said about the poultry-journals, there is one great and grievous fault with most of them, and a matter that can be easily remedied. It wants a little push and gumption, getting up early in the morning, or something of that sort. It is this: These journals are allowed to go out to the reading public without being inspected and corrected. I refer particularly to the typography. For instance, the printer or compositor will pull out a line to make some needed change, and then he puts it back without getting it in the proper place. Sometimes it will be at the bottom of the column, and sometimes it will not be found anywhere. He evidently forgot to put it back. The result is that the reader, when deeply interested in some article, finds a line gone so as to make the whole thing nonsense. I often spend a good deal of time in going down the column to find the missing line somewhere, where it makes another jumble. Now, this is a stupid trick of the one who puts the lines into page form to be sure; but he is not *altogether* to blame. Every journal or periodical of any kind that hopes to succeed should have somebody who is conversant with the subject-matter to read over carefully every bit of matter before it goes to press. This person or expert, which he ought to be, should be trained to note every letter upside down, bad punctuation, bad spelling, or any thing of that sort, so that, when the periodical meets the eye of the one who pays his money for it, it will be clean, and clear up to date. Our high-priced periodicals of wide circulation have two or more proof-readers in order to be sure that no blunders are allowed to pass.

Now, some of you may think this is a small matter; but that is another "typographical error." Leaving out a line as I have mentioned, bad spelling, and bad punctuation, stamp a periodical at once as second-class or not strictly reliable; and if the matter is not mended the journal soon fails for lack of patronage. When GLEANINGS was first started, nearly forty years

*Have we any other periodical whose editorials occupy such a high moral stand as the *Sunday School Times*? And is not the above sentiment characteristic of this same clean home Christian sheet?

ago, I realized the importance of this very thing; and under no circumstances was a single number allowed to go to press before I myself had carefully scanned every page and every line. I sat up nights and got up early in the morning; and when I was obliged to leave home, proofs were mailed me, and a boy often rushed over to the cars just as I was getting on, to give me a proof-sheet which I corrected on the train and mailed back. The reason why GLEANINGS was a success from the very start, and kept increasing and spreading every year for almost forty years, is just because we have taken such scrupulous pains to have it clean, correct, and reliable; and I am glad to add that perhaps no other one has stood by me and helped me in this work as has my good friend W. P. Root, who is now taking down these words stenographically. He has been my right-hand man in this effort to have our journal fully up to the standard of our first-class magazines for over thirty years. Just a few days ago I laughingly told some of our friends in the printing-office that I had for the first time in my life found our old friend at fault in spelling; but a more careful investigation showed that he was not entirely at fault after all, as the mistake was in the choice of a wrong word.

And now I wish to say again to the editors of the poultry-journals, this one thing I have been talking about may turn the scale between success and failure. If you expect your respective journals to win a place among the journals of our land you must have them clean and readable. I know it takes good, earnest, faithful work, early and late; but that is the price of success, and the only price.

By the way, with the present enthusiasm for poultry a new poultry-journal starts about every month;* but I am sorry to add that a poultry-journal dies about that often. So far as I know, there is not a single poultry-journal published at the present time in the whole State of Florida, with all its possibilities. One was started a few years ago, but it failed, principally, I think, for the very reason I have mentioned.

I am pleased to add, in closing, that our foreign journals are beautiful specimens of accurate and fine mechanical work; in fact, it is rather proverbial that the English, especially, never permit anything to go out to the reading world unless it is first-class in regard to typography; and they really have some reason for calling us, as they often do, "a lot of shiftless Yankees."

CHUFAS, SOY BEANS, DANDELIONS, PARCELS POST, ETC.

Mr. Root:—I have read what you say on pages 608, 609, on soy beans and chufas for chickens, etc. I have never succeeded in getting my White Wyandottes to eat either soy beans or chufas, and

*Perhaps you will excuse me for saying right here, that during the past forty years a dozen or twenty bee-journals have been started; but sooner or later most of them have gone under, principally because of their carelessness along the line I have mentioned.

have offered them on a few occasions. I have had chufas dug up and lying on the grass two or three weeks, with alternate rain and sunshine, where the chickens could help themselves (sixty, old and young), and have not missed one nut.

You quote an advertisement of soy-bean meal, and seem to infer that it is merely soy beans ground up. I believe this meal is a by-product from the soy-bean oil-mills of China or Manchuria, just as our linseed meal is of our linseed-oil mills. This meal is imported very largely in Europe for feeding stock, as our linseed meal is.

You say chufas, like other nuts, are rich in protein and carbo-hydrates. You should have said, rich in protein and fat. Chestnuts are, I believe, the only nut rich in carbo-hydrates, while nearly all are rich in protein and fat—especially the latter.

I notice you are getting out a booklet on buckwheat. I should like to suggest that you get some one well informed on the subject to write on the use of buckwheat for green-manuring, killing persistent weeds, and as a nurse crop for sowing alfalfa, crimson, and other clovers. I have seen it advised very strongly for the latter purpose—in the *Rural New-Yorker*, I believe. Summer is deemed by many the best time to sow alfalfa, red and alsike clover, and crimson clover can be sown only then.

I note in Ohio Bulletin No. 207 that cotton-seed meal is rated on the favorable side as stock feed; and in my reading I notice a flour is being made from cotton-seed for bread-making. We have need of just such a product for mixing with our one-sided acid-producing white flour to make healthful bread.

Another thought on buckwheat. May it not be sown early, allowed to blossom for the bees to gather the honey, then turned under, and another crop of buckwheat sown for grain, honey, and as nurse crop for clovers? Too much can hardly be known by bee-keepers about buckwheat and clovers.

Would it not be feasible to sow buckwheat in the buckwheat belt, sowing alsike at the same time, then let the bees gather the buckwheat nectar, you harvest the buckwheat, then let the bees gather the alsike nectar the following June, cut a crop of hay, possibly a crop of seed, then repeat the process, getting two crops each year, and two gatherings of nectar, while enriching the land with nitrogen at the same time? I believe it can be done, and bee-keepers are the ones to do it. Buckwheat is quite profitable where conditions are favorable, and alsike for seed is very much so.

As stated above, I have about sixty White Wyandottes, and can not notice that a piece is missing from a single leaf of the dandelions growing all around my grounds. Possibly the reason is that my chickens have full liberty, and thus may obtain what they like better—insects, grass, etc. They do eat great quantities of grass, I know, as I see them doing so, much of the time; and a hawk killed one and tore open its crop, which seemed to be stuffed with grass solely. Is it not likely that your Leghorns found what suited them? I am very fond of dandelion greens, and consider them healthful.

I note you advise cooking ground wheat thoroughly before eating. I believe this to be an error. It is apt to encourage too rapid eating, and cooking seems to necessitate the use of sugar to some extent, and this, I feel certain, is wrong. Our nutrition scientists have found that the average American dietary is about 17 per cent protein, 25 per cent fat, and 58 per cent carbo-hydrates—more protein for growing children and those at hard labor, and less for the aged and inactive. By looking at a table in my letter published on p. 396, 1910, you will see that wheat has protein, 11.1 per cent; fat, 1.7 per cent; carbo., 75.5. Granulated sugar is 100 per cent carbo-hydrates. Thus wheat is 30 per cent above a balanced ration in carbo-hydrates, and every grain of sugar makes it more so, while it has only about one-tenth the fat it should have. Therefore butter or cream, not sugar, is the proper thing to add to help balance it. Nuts, cheese, or other foods rich in fat or protein, should go with wheat; sugar, never. Rolled oats are much better balanced, but need fat to balance. Americans consume an average of about \$5.00 worth of sugar per capita per year, and great quantities of molasses and syrup in addition. If this were reduced to one dollar, and the remainder expended for milk or butter or cheese, or even for honey, we should be infinitely better off.

I note what you say about parcels post. Too much can not be said for this great boon to our producers and consumers. The middlemen are the

only ones that would be hurt. The Postoffice Department is run as a political machine, to give fat offices to henchmen at immense expense. About ten million dollars could be saved annually by abolishing the salaried postmasters, leaving the assistants to do the work as they now do. This would also greatly benefit the people by removing and quieting the many disturbing, offensively partisan politicians. I know a postmaster who has a business of his own where he may be found six or eight hours a day. He drops in at the postoffice two or three times a day, usually, and spends the rest of his waking hours at the club. About the hardest work he does at the postoffice is drawing his salary of \$200 a month. It costs me 16 cents to send a pound of laundry to the agent at the postoffice nearest my own, two miles away. A 300-lb. man with a 150-lb. trunk and a 50-lb. suit-case may go on the same train for 5 cents. Is that good business management? I can send the pound package to New Zealand, 10,000 miles, for 12 cents. Yet the government forbids the railroads charging more for a short haul than for a long one. The *Farm Journal*, published in Philadelphia, price the paper just double for delivery in Philadelphia than they price it for delivery in San Francisco, Alaska, or Mexico. Is that business? A law of the United States forbids any one carrying letters or packages (mailable) between postoffices; yet the express companies are allowed to carry nearly all daily papers, and millions of other packages under four pounds, greatly injuring the government. If a common citizen attempts to use a postage-stamp a second time it may cost him a heavy fine and imprisonment; but the express companies may defraud the government out of millions of dollars with impunity.

If you have not seen the document on parcels post by Hon. David J. Lewis, Cumberland, Md., you should ask him for a copy and read it. His is the best solution of the parcels-post question, I believe. He proposes to buy the express companies for some forty millions of dollars and run them at cost to the people. He shows that the express companies have contracts with the railroads to carry expressage at about $\frac{1}{2}$ cent a pound, while mail costs the government over 4 cents. Most of the parcel-post advocates talk 8 cents a pound, which is prohibitive, and of no value to producers or consumers of one pound in a thousand. Personally I would not be in favor of paying the express companies for their charters or contracts, deeming them thieves, robbers, and law-breakers; and thieves have no right to stolen property. But it would take years of litigation to oust them, and it would be cheaper for the people to buy them out and get the benefits of low rates of transportation. By all means write for a copy of Mr. Lewis' document and read it, and then tell your readers to do likewise. It is an eye-opener by a man who has studied the question thoroughly, and written ably on it. The document is free, Mr. Lewis being a Congressman.

A READER.

My good friend, there are two reasons why your chickens decline soy beans, chufas, and dandelions. First, they are not *hungry* for green food, like the flock belonging to my daughter. Second, they have not been *educated* to eat these things. This whole matter comes right along with the statement from so many that cattle and horses will not eat sweet clover. They have not become acquainted with sweet clover. Domestic animals, like human beings, become accustomed to a certain diet, and very often think they can not live on any thing else. Changing the food of a lot of chickens to something they are not used to will often stop their laying. This has often been commented on. I feel sure you can teach your chickens to eat chufas, soy beans, and dandelions. Down in Florida, where green stuff is often scarce, the poultry seem to eat every thing green greedily. As an illustration, it is of no use to try to grow potatoes if the chickens can get at them. They will eat

off the tops and then scratch out the tubers and eat them. A hen with chickens is especially expert at that kind of work.

The book we sell on green manuring mentions particularly plowing buckwheat under, two crops, one right after the other. Crimson clover and alsike both do splendidly when sown with buckwheat in July or August.

Parcels post is coming; and if our great nation of people keep urging, it will come all the sooner.

I agree with you in regard to the excessive use of sugar. My health is very much improved since I have given up sugar for so long a time that I have almost lost my appetite for it. Sugar on fruit or any fruit sauce spoils it for my use. Very likely you are right about using uncooked wheat. That is Terry's great forte, as you may recall.

ABSCONDING SWARMS, AND SOMETHING ELSE.

The following is from our good friend Calvin S. Hunter, of Seven Mile, O., the man I visited, and which visit I reported on these pages—the man whose hobby has been, during a good long life, *more* corn and *better* corn. He is also something of a poet as well as a most earnest Christian, as you will gather from the little poem at the end of his letter.

Mr. Root:—I am sure you will be glad to hear how the four swarms of bees that came to me last season in five days are coming on. They were surely welcome, for we are very fond of bees, and had none. We think that the "streak of luck" was to include five swarms in five days. But one was lured into the hollow of a great maple near by. They have done remarkably well, so that no neighbor who needed honey has been disappointed, and our bee inspector says they are the nicest black bees he ever saw. I have hopes that my luck has not entirely changed; for, although I have tried to prevent swarming, yet late in May, this year, one of the swarms showed signs, and so I got a hive ready; but before I got away, here came a swarm rolling like a balloon down the lane from the west gate, and it just covered the lid of the hive I was fixing, so I feared the queen was outside; but it was all right.

I send you some of my verses, entitled—

THAT NEW LIFE.

We are nearing that home where our loved ones must sleep,
And the friends are so weighted with sorrow;
But though hearts are bowed down like the willows that weep,
Yet we know we shall meet them to-morrow.

Refrain.

For they'll watch and they'll wait at that beautiful gate;
They will cherish fond memories ever;
Tho' life's sun disappears in the mists of the years,
Yet that new life, it fades not—no, never.
Oh! we're fast passing through this dark valley of tears;
Each kind friend that we lose gives us warning
That it may be to-day, and can be but few years
Ere we all greet that heavenly morning.
Then we'll keep a brave heart while forgetting our fears.
Tho' earth's ties ruthless Time may soon sever;
For life's sun it sinks fast when 'tis weighted with years,
But that new sun will shine on for ever.

Seven Mile, O., July 18. CALVIN S. HUNTER.